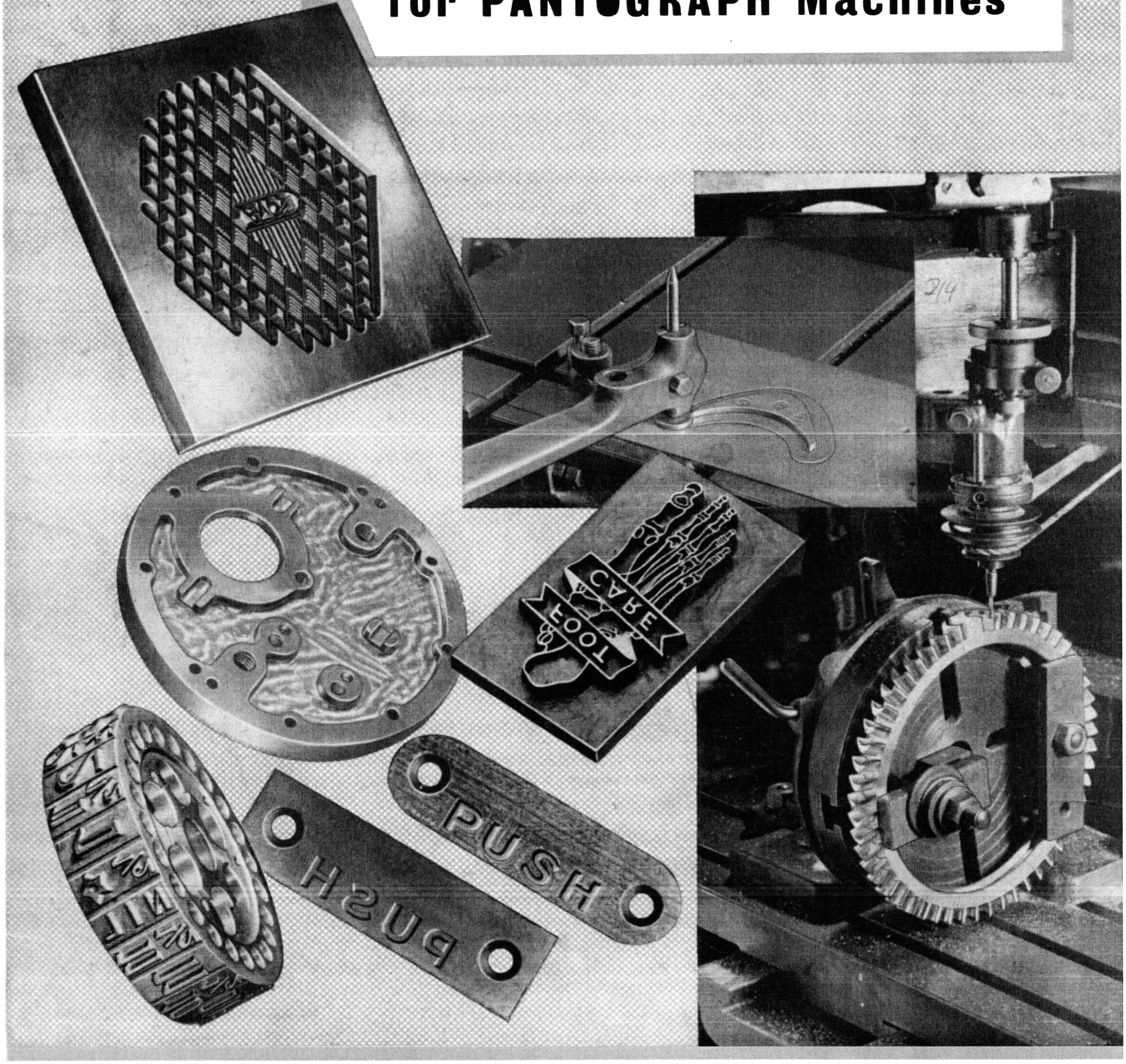
14-5

TAYLOR-
HOBSON

ACCESSORIES
for PANTOGRAPH Machines


FOOT CARE
PUSH
PUSH

TAYLOR, TAYLOR & HOBSON, LEICESTER, ENGLAND

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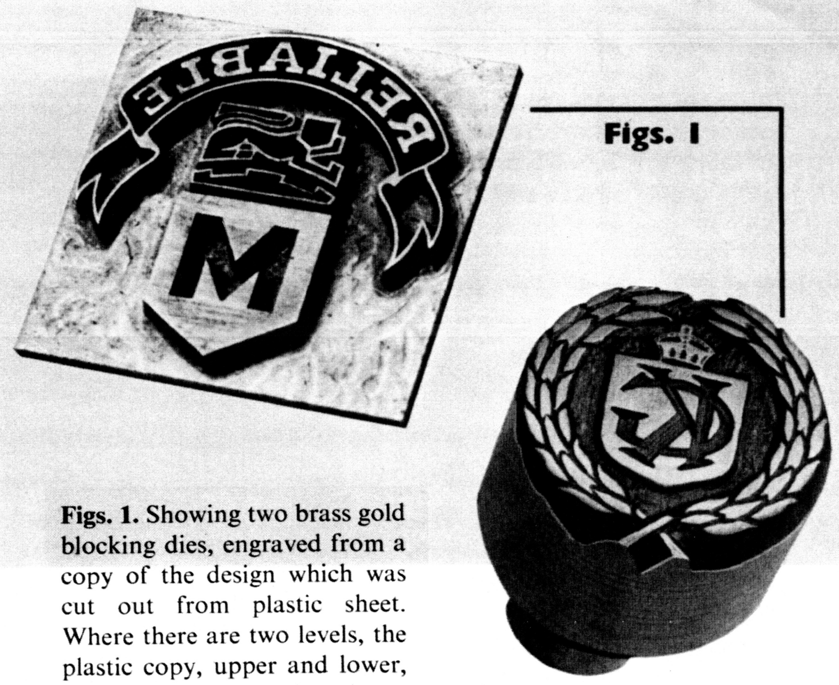
Examples of Work are shown throughout the booklet

TYPICAL EXAMPLES OF WORK MADE ON PANTOGRAPH MACHINES



Figs. I

Figs. 1. Showing two brass gold blocking dies, engraved from a copy of the design which was cut out from plastic sheet. Where there are two levels, the plastic copy, upper and lower, are cemented together by a suitable cement.

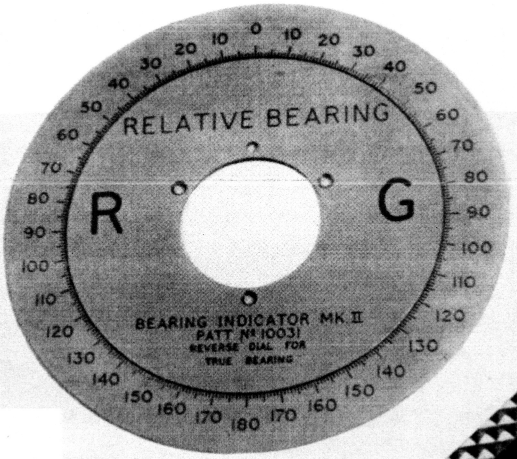


Fig. 2

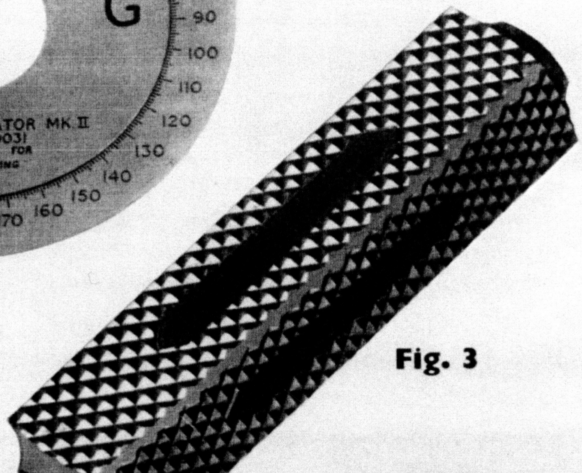


Fig. 3

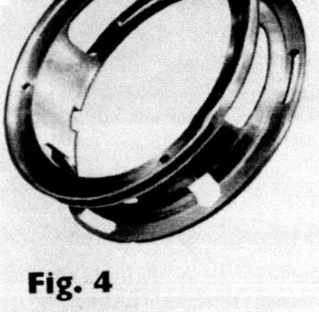


Fig. 4

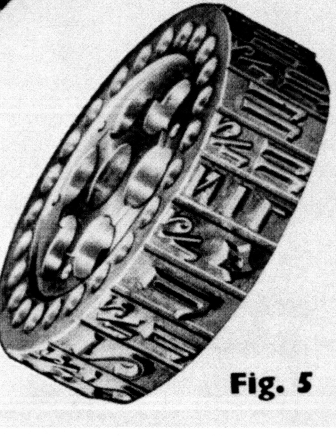


Fig. 5

Fig. 2. A typical plastic scale which has been engraved from the back with standard copy characters in reverse and filled with colour. This type of work is widely used for indication panels, nameplates and in display work.

Fig. 3 is an illustration of a solid steel mould, cut on the engraving machine, the mould being used for white metal cast impressions, from which bicycle pedals are then made in rubber. Rubber soles and heels for footwear are made in this manner.

Fig. 4 is a typical illustration of toolroom usage, and work such as the example is made either by rotating the piece on a suitable revolving table, or by using simple curved line copies.

Fig. 5. Illustration shows a standard printing wheel, which is cut from special raised masters, section by section, by revolving on a suitable table with an indexing device.

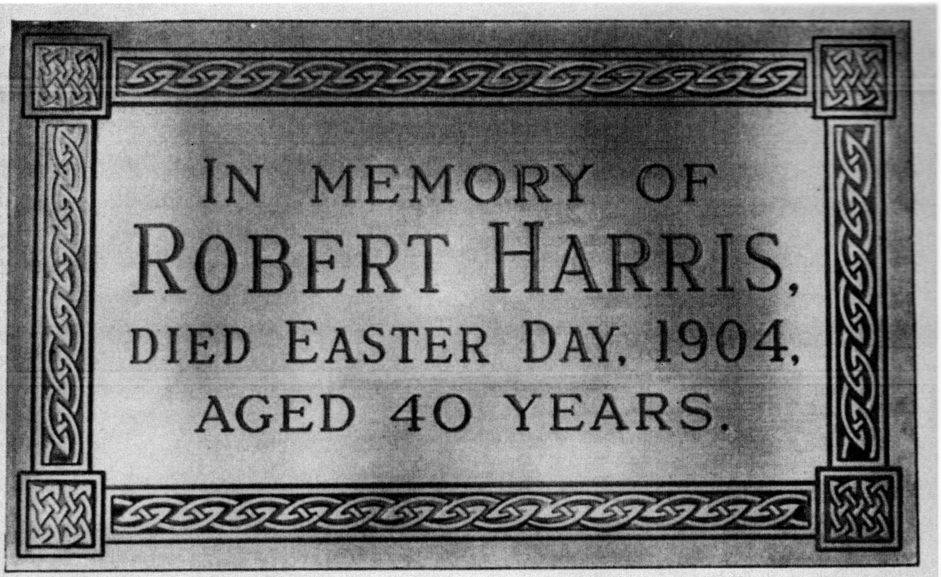
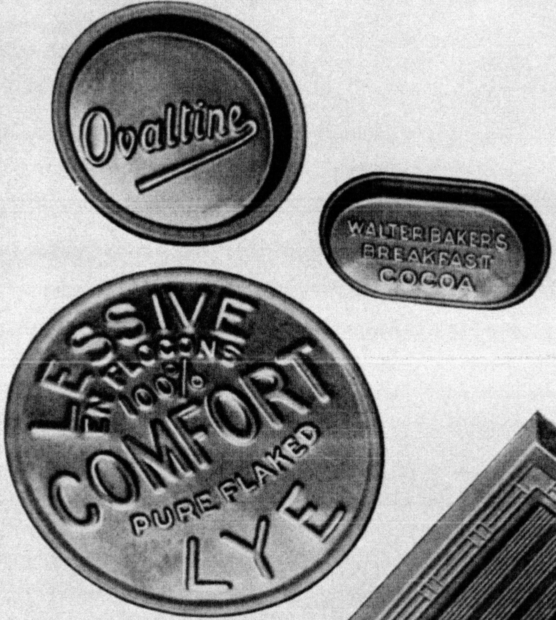

IN MEMORY OF
ROBERT HARRIS,
DIED EASTER DAY, 1904,
AGED 40 YEARS.

Fig. 6

Fig. 6. A typical memorial plate cut in brass using special character sunk copy. This nature of work can be very ornate or quite simple, as on a coffin plate and all manner of name-plates, etc. The border in this illustration is a good example of producing engraving by repeating a small section of the border design, over and over again, around the rectangular plate.


Ovaltine
WALTER BAKER'S
BREAKFAST
COCOA
LESSIVE
EN FLOCONS
100%
COMFORT
PURE FLAKED
LYE

Figs. 7

Figs. 7. All manner of embossed tin lids, milk bottle tops, etc., can be produced from a sunk die, cut on the pantograph machine. Two of the tin lids shown have been produced from standard copy, whilst the word 'Ovaltine' was a special drawn copy. No counterpart is used in producing such lids, where they are made out of thin metal, as a suitable rubber sheet will act as the counterpart when work is in the press.

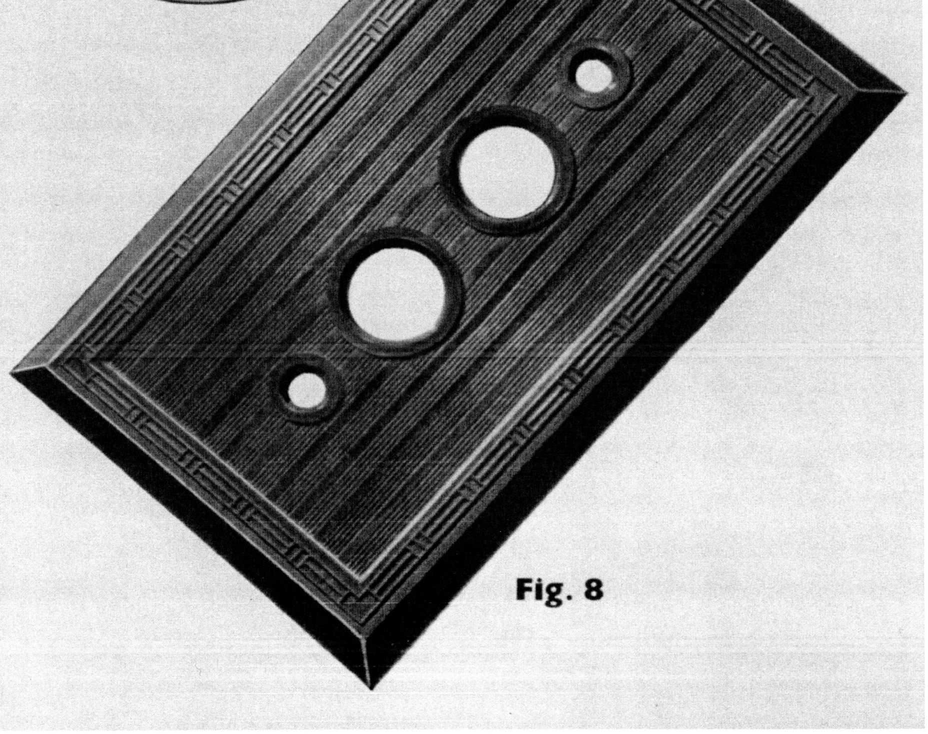


Fig. 8

Fig. 8. The machines are widely used for producing the moulds or dies from which all manner of plastic work is produced as in the example shown of a switch plate. The border in this case required very simple copy, which was repeated by tracing the pantograph style over and over the identical copy.

The examples of work shown are by courtesy of:
S. G. Brown Limited, Watford, Herts.
Arrowsmith & Brooks Ltd., London, E.C.1.
Avenue Engraving Co. Ltd., Richmond, Surrey.
A. & G. Edgington, Leicester.
J. S. Drew Ltd., Bath Road, Cippenham, Slough, Bucks.
Parco Industries, Parco Works, Albion Road, Horsham, Sussex.

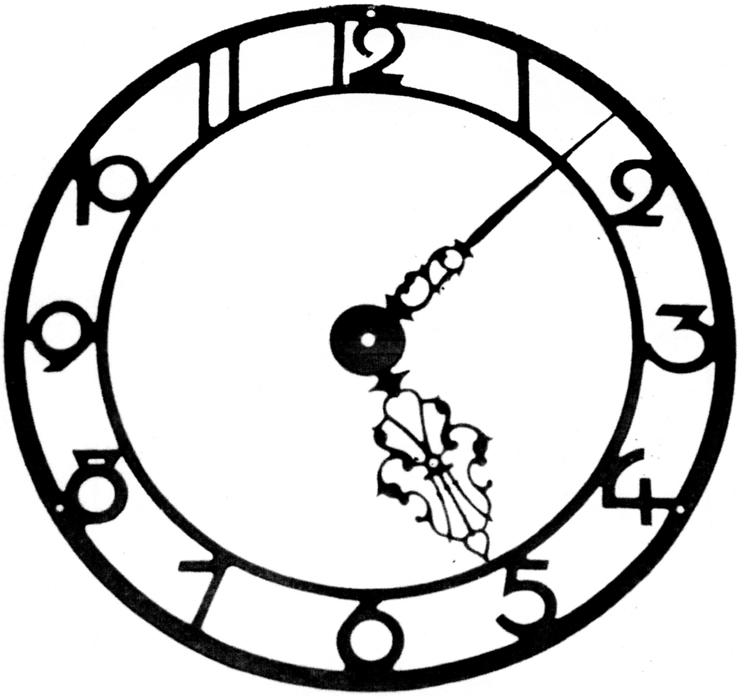
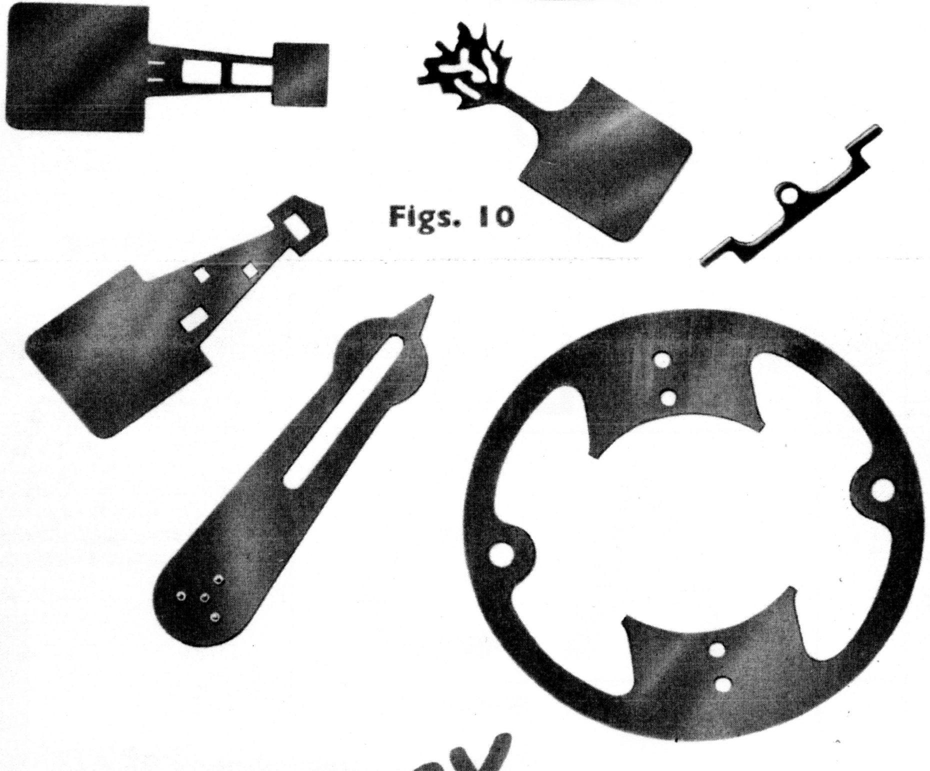


Fig. 9

Fig. 9. The illustration of the clock dial is an example of work made from sheet metal, the cutter cutting right through to the required shape. The copy in this case was twice size, and formed from an outline in celluloid of the dial portion, and four times the size for the two hands.



Figs. 10

Figs. 10. The six illustrations shown opposite are good examples of producing a number of different shapes when the quantity is too large for making by hand, but not sufficient to warrant the expense of making press tools. Engraving, drilling any number of holes correctly spaced, slotting and milling can be produced at one setting.

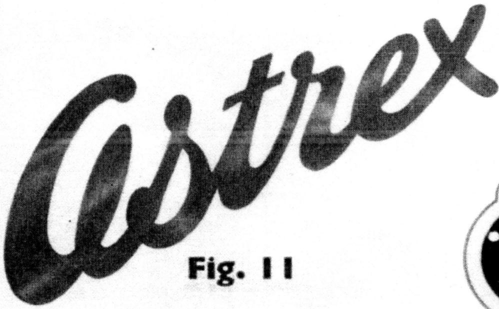


Fig. 11

Fig. 11. The cut-out word 'Astrex' typifies work produced in Perspex and such material for display purposes, the celluloid copy being twice size.

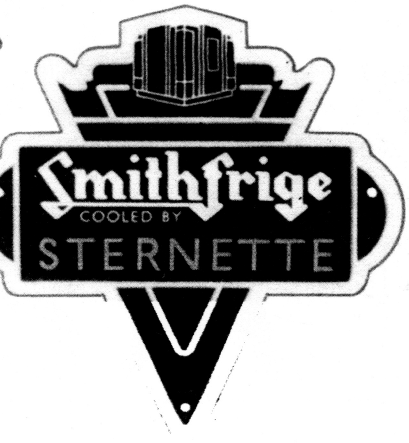


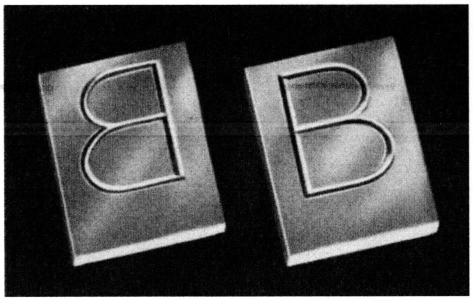
Fig. 12

Fig. 12. This example of a display piece was produced from the back of the sheet plastic in reverse and then coloured in three colours to customer's requirements. The scope and range of this class of work is very considerable, and almost every shop window display reveals examples of these semi-permanent, point-of-sale pieces.

Copy Section

STANDARD LINE COPY CARRIED IN STOCK, SUNK AND RAISED COPY MADE TO ORDER

Copy No.	Showing the size of letters which can be produced at **3:1 REDUCTION** using the different copy numbers as given in first column.
2A	ABCDE 5
2L	abcde
2C	ABCDE 5
5A	AB5
5L	ab
5C	AB5
3A	A5
3C	A5
4	Aa5

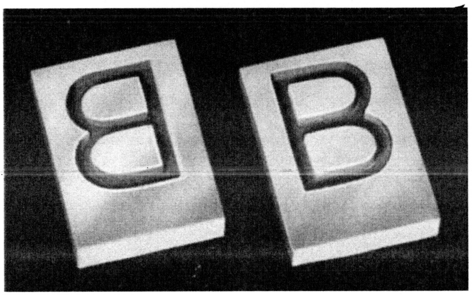


LINE COPY

Line Copy is the outline of the character, formed by a vee groove which matches with the 90° conical point of the pantograph style. With the style point maintained in good condition, the copy will have a long life. The angular section prevents the style being slack in the copy, even when the copy is worn.

The height of the copy character is measured from centre line to centre line.

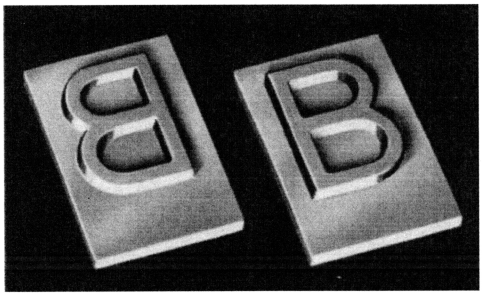
The width of line of the character can be varied only by changing the cutter size.



SUNK COPY

Sunk Copy is used for producing characters with varying widths of line, such as Roman, Old English, etc., or line characters wider than those that can be engraved from Line Copy. The style should have a flat end, and be in the form of a cylinder or a roller.

Sunk Copy is made to order in styles corresponding to the block and condensed styles of Line Copy, and in the styles shown on page 8. Also in reverse.



RAISED COPY

Raised Copy is the exact counterpart of the Sunk Copy, and can be made to order in the corresponding sizes and styles.

Raised Copy necessitates clearing away surplus material surrounding each of the work characters, and in doing this sufficient material must be left on which to engrave the next character. The copy characters should be mounted on one piece in correct relation to each other.

Sunk and Raised Copy can be used in conjunction, as may be required when making boss dies, but owing to a difference in the heights of the copy character, neither can be used in conjunction with Standard Line Copy.

Standard Line (Brass) Copy carried in Stock

Code	Copy No.	* *Letter height* † *Bevel width*	*Sets consist of characters as below*	*For use with Copy holder No.*
110/32	2A	* ¾ in. (19 mm) † 1¼ in. (32 mm)	Consists of 128 characters: **A B C D E F G H I J K L M N O P Q R S** (4) (3) (3) (3) (7) (3) (3) (3) (3) (2) (2) (4) (3) (3) (3) (2) (1) (3) (4) **T U V W X Y Z & LTD o x — 0 1 2 3 4 5 6** (4) (3) (2) (3) (1) (1) (1) (2) (1) (2) (1) (1) (3) (3) (3) (3) (3) (3) (3) **7 8 9 . , : ; ‘ ’ +** (3) (3) (3) (4) (4) (1) (1) (2) (3) (1) Also spacings (10 ea.): **·375 in. (9,5 mm) ·25 in. (6,3 mm) ·125 in. (3,2 mm)**	2 & 2X
110/33	2C	* ¾ in. (19 mm) † 1¼ in. (32 mm)	Exactly as 110/32, but narrower style characters	2 & 2X
110/41	2A reversed	* ¾ in. (19 mm) † 1¼ in. (32 mm)	Exactly as 110/32, but reversed copy	2 & 2X
110/42	2C reversed	* ¾ in. (19 mm) † 1¼ in. (32 mm)	Exactly as 110/33, but reversed copy	2 & 2X
110/34	2L	Lower case to match 2A or 2C † 1¼ in. (32 mm)	Consists of 102 lower case letters to combine with 110/32 or 110/33: **a b c d e f g h i j k l m n o p q r s** (5) (4) (4) (4) (7) (4) (3) (4) (6) (3) (3) (5) (3) (4) (6) (3) (2) (4) (5) **t u v w x y z &** (5) (3) (3) (3) (2) (3) (2) (2)	2 & 2X
110/43	2L reversed	Lower case to match 2A or 2C reversed † 1¼ in. (32 mm)	Exactly as 110/34 but reversed copy	2 & 2X
110,35	3A	* 3 in. (76 mm) † 3½ in. (89 mm)	Consists of 42 characters: 1 each of capital letters **A** to **Z**, 1 each of figures **0** to **9**, **+**, **—**, **o**, **LTD**, **&**, **x**	3
110/36	3C	* 3 in. (76 mm) † 3½ in. (89 mm)	Exactly as 110/35, but narrower style characters	3
110/37	4	* 3 in. (76 mm) † 4½ in. (114 mm)	Consists of 69 characters: 1 each of capital letters **A** to **Z** in 3A style, with **&**, 1 each of matching lower case letters **a** to **z** with **&** and **LTD**. 1 each of figures **0** to **9**, and **x**, **+**, **—**, **o**	4
110/38	5A	* 1½ in. (38 mm) † 2¼ in. (57 mm)	Consists of 88 characters: **A B C D E F G H I J K L M N O P Q R S** (2) (2) (2) (2) (3) (2) (2) (2) (3) (1) (1) (2) (2) (2) (3) (1) (1) (2) (2) **T U V W X Y Z & x — 0 1 2 3 4 5 6 7 8** (2) (1) (1) (2) (1) (1) (1) (1) (1) (1) (2) (2) (3) (3) (3) (3) (3) (3) (3) **9 . , : ; ‘ ’ + o LTD** (3) (2) (2) (1) (1) (1) (1) (1) (1) (1) Also spacings: (5) **·375 in.** (9,5 mm) (10) **·25 in.** (6,3 mm) (15) **·10 in.** (2,5 mm)	5 & 5X
110/39	5C	* 1½ in. (38 mm) † 2¼ in. (57 mm)	Exactly as 110/38, but narrower style characters	5 & 5X
110/40	5L	Lower case to match 5A or 5C † 2¼ in. (57 mm)	Consists of 80 characters to combine with 110/38: **a b c d e f g h i j k l m n o p q r s** (4) (3) (3) (3) (5) (3) (3) (3) (5) (2) (2) (4) (3) (4) (5) (3) (1) (3) (4) **t u v w x y z &** (4) (3) (2) (3) (1) (2) (1) (1)	5 & 5X
110/50			1 each of letters **A** to **Z** in No. 2A style	2 & 2X
110/105			1 each of figures **0** to **9** in No. 2A style	2 & 2X
110/51			1 each of letters **A** to **Z** in No. 2C style	2 & 2X
110/106			1 each of figures **0** to **9** in No. 2C style	2 & 2X

Standard Line (Hard Steel) Copy carried in Stock

110/645	2A	No. 2 Copy * ¾ in. (19 mm)	As 110/32	2 & 2X
110/647	2C		As 110/33	2 & 2X
110/646	2L		As 110/34	2 & 2X

Copy Section

CHELTENHAM
Sunk Copy

No. 2 Copy, ⅞ in. (22 mm) overall height.

Code No. 110/619. 227 Capital and lower case letters and figures.

No. 5 Copy, 1¾ in. (44 mm) overall height.

Code No. 110/618. 158 Capital and lower case letters and figures.

ABCDEFG&
123bcdefghijk&.
Presented by

ROMAN
Sunk Copy

No. 2 Copy, 1 in. (25 mm) overall height.

Code No. 110/653. 123 Broad capital letters and figures.
Code No. 110/652. 123 Medium capital letters and figures.

No. 5 Copy, 1½ in. (38 mm) overall height.

Code No. 110/608. 88 Broad capital letters and figures.
Code No. 110/656. 88 Medium capital letters and figures.

No. 3 Copy, 3 in. (76 mm) overall height.

Code No. 110/607. 37 Broad capital letters and figures.
Code No. 110/648. 37 Medium capital letters and figures.

ABCDE 0456
ABCDMO &123

TRAJAN ROMAN
Sunk Copy

No. 5 Copy, 1½ in. (38 mm) overall height.
Code No. 110/657. 85 Capital letters and figures.

No. 4 Copy, 3 in. (76 mm) overall height.
Code No. 110/649. 37 Capital letters and figures.

Owing to the extra long tail of some of the characters, this copy is carried on No. 4 Copy strip, and fits the No. 4 Copyholder only.

ABCDEJKQSUW
R& 123456789

OLD ENGLISH
Sunk Copy

No. 2 Copy, ⅞ in. (22 mm) overall height.

Code No. 110/617. 227 Capital and lower case letters and figures.

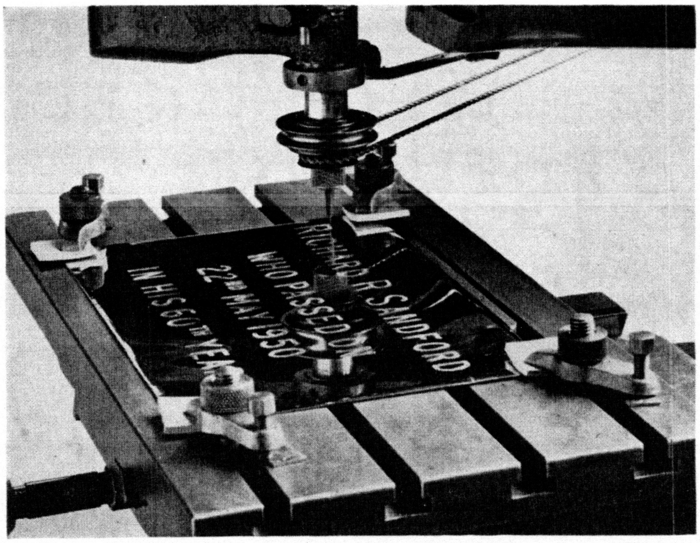
No. 5 Copy, 1¾ in. (44 mm) overall height.

Code No. 110/616. 158 Capital and lower case letters and figures.

ABC MNOPZ
345 Old English..

All the copy listed on this page is also available in reverse.

Copy Section



Funeral Directors' Copy

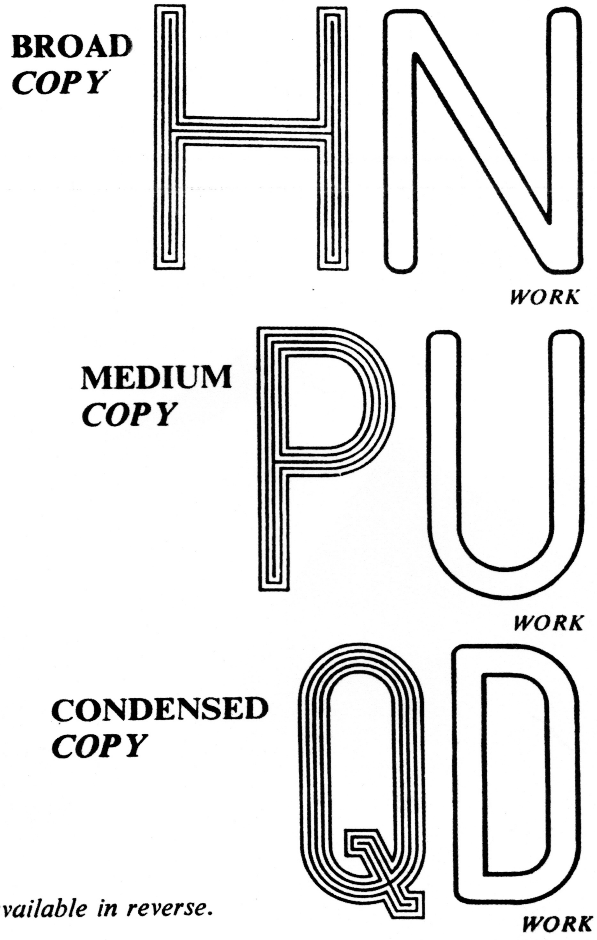
Code No. 110/622.

This is a set of condensed style Line Copy designed specifically for engraving coffin plates and small memorial plates. The set of copy is made up of words, abbreviations and characters, as listed below. It is for use in the 5X Copyholders.

JAN.—DEC. 195 . RIP. BORN DIED AGED
IN HIS IN HER YEARS AT REST

51 Large Capital Letters for use as initials 1⅝ in. (41 mm) high. 99 Small Capital Letters 1¼ in. 32 mm) high.

4 Abbreviations—ST. for 1st. ND. for 2nd.
RD. for 3rd. TH. for 4th. etc.



Copy is available in reverse.

Multi Line Copy

Multi Line Copy enables the user to obtain square-ended engraved characters.

The Master Copy of each of the letters of the alphabet consists of five vee-grooves, as shown in the illustrated letters H, P and Q.

Alternatively, any selected vee-groove can be used to accommodate the 90° conical point of the pantograph style, as when engraving outline letters as illustrated, N, U and D.

Multi Line Copy can also be used to engrave other letter formations, as when using the centre vee-groove with any one or more of the other four.

It can also be used as Sunk Copy, as illustrated by the line MULTI LINE ENGRAVING. To clear away the material from within such work, the cutter must have a flat end with its diameter equal to the ratio of the width between centres of copy grooves to pantograph reduction.

No. 3 Copy, 3 in. (76 mm.) overall height.
Code No. 110/658 Broad style.
Code No. 110/659 Medium style.
Code No. 110/660 Condensed style.
All sets consist of 42 capital letters and figures.

No. 5 Copy, 1¾ in. (44 mm.) overall Height.
Code No. 110/609 Broad style.
Code No. 110/610 Medium style.
Code No. 110/611 Condensed style.
All sets consist of 88 capital letters and figures.

MULTI LINE ENGRAVING

GILL SANS
Line Copy

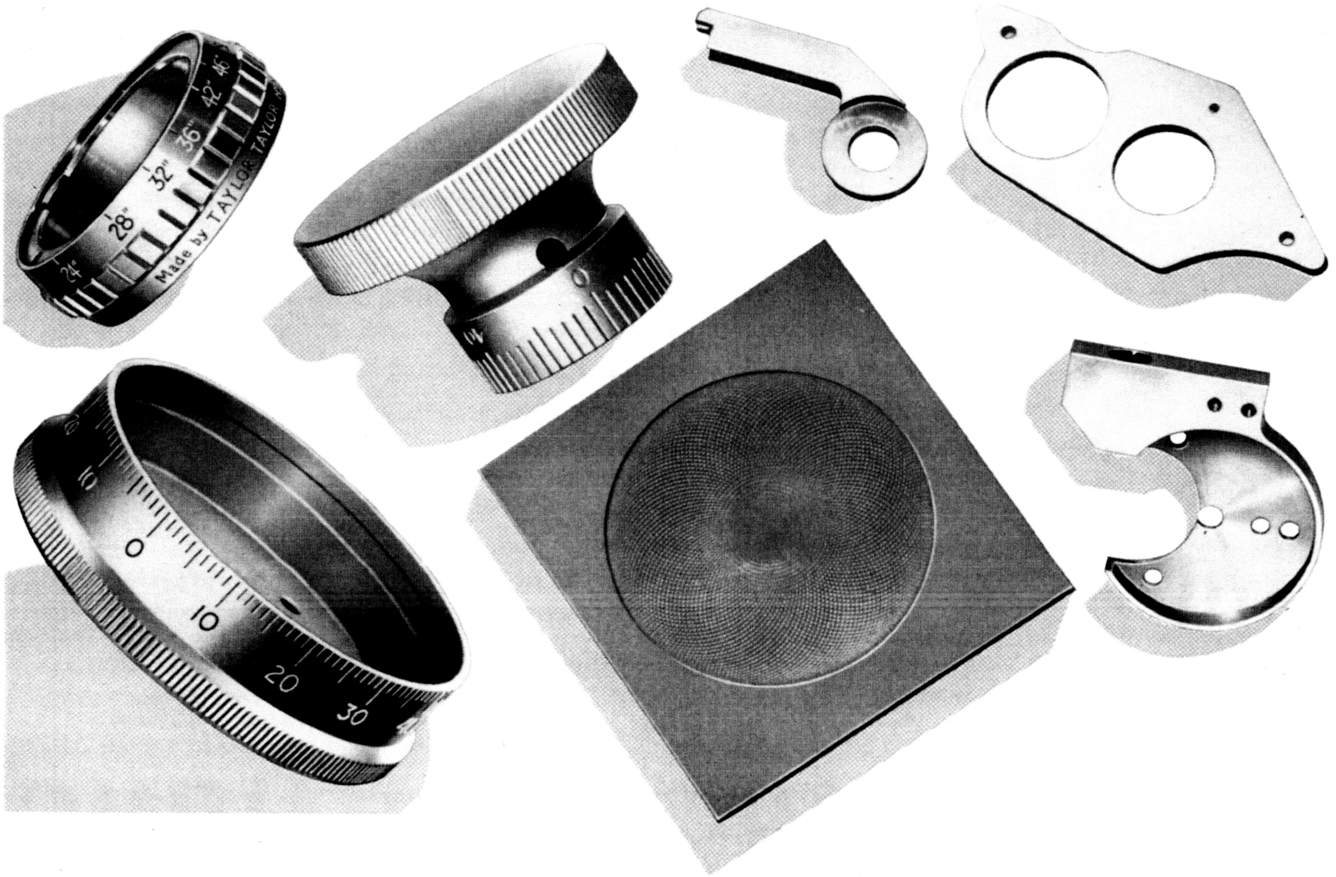
No. 2 Copy, ¾ in. (19 mm) high.
Code No. 110/614. 128 Block capital letters and figures.
Code No. 110/615. As above but reversed.
Code No. 110/650. 102 Lower case letters.
Code No. 110/651. As above but reversed.
No. 5 Copy, 1½ in. (38 mm) high.
Code No. 110/612. 88 Block capital letters and figures.
Code No. 110/613. As above but reversed.
Code No. 110/654. 80 Lower case letters.
Code No. 110/655. As above but reversed.

ABCDEFGHJKSO
1234567890&
abcdefghijklmnopq

ITALIC
Line Copy

No. 2 Copy, ¾ in. (19 mm) high.
Code No. 110/621. 128 Block capital letters and figures.
No. 5 Copy, 1½ in. (38 mm) high.
Code No. 110/620. 88 Block capital letters and figures.
Both sizes also available in reverse.

ABCDEFG 4567



Copy Section

Special Copy

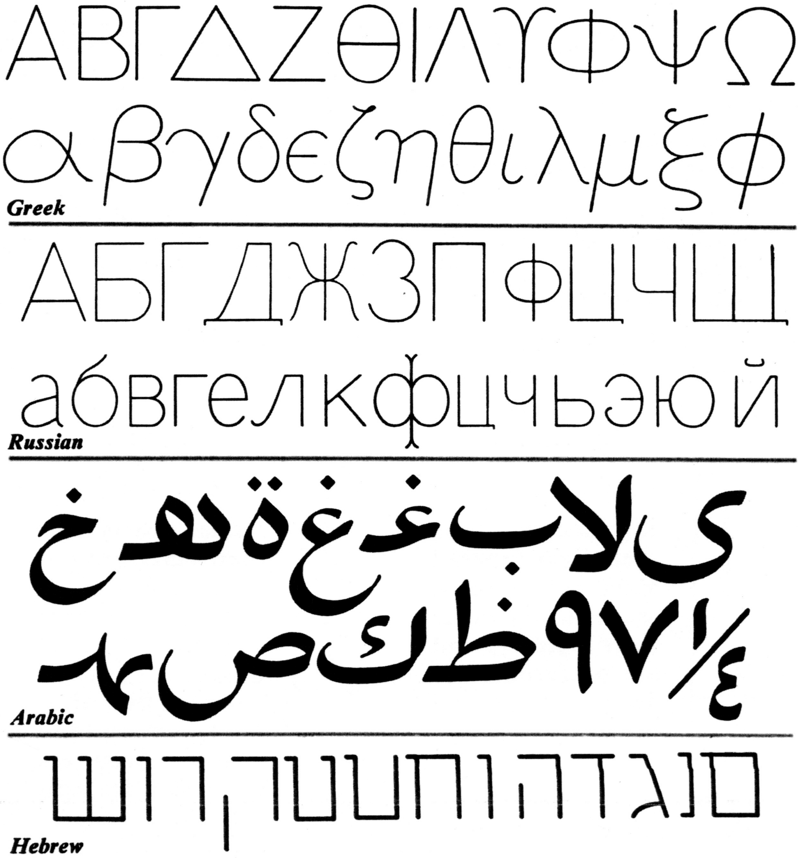
Complete alphabets in Greek and Russian characters are available. Full details of copy size, number of characters supplied as a set, size of Copyholder required and price will be supplied on request.

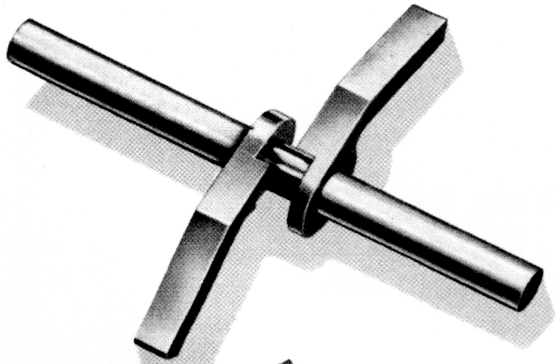
Greek	Block capital copy, corresponding to the English 'A' style, in sizes up to 3 in. (76 mm) high. Condensed capital copy, corresponding to the English 'C' style, in sizes up to 3 in. (76 mm) high. Lower case to combine with the block capitals, but sizes up to a height of 1 in. (25 mm) only.
Russian	Block capital copy corresponding to the English 'A' style in sizes up to 3 in. (76 mm) high. Lower case to match the above.

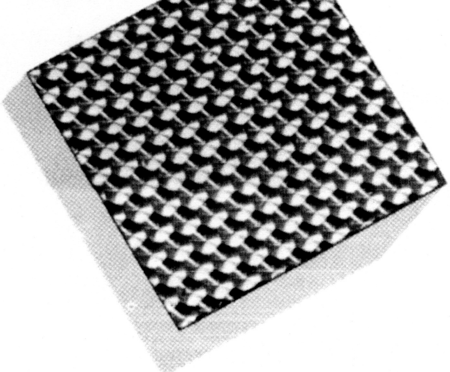
Other Characters

Copy can be made for any language or style of character. Customers are advised to supply prints or drawings of each character required.

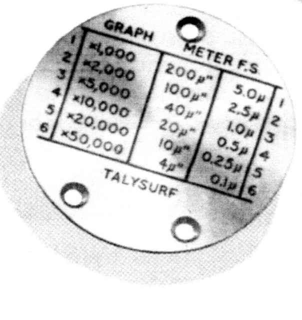
Examples shown are of Arabic and Hebrew characters engraved from copy regularly supplied to Engraving Machine users at home and overseas.


ΑΒΓΔΖΘΙΛΥΦΨΩ
αβγδεζηθιλμξφ
Greek
АБГДЖЗПФЦЧЩ
абвгелкфцчьэюй
Russian
Arabic
Hebrew





Regesan
PALM OLIVE
OIL SOAP


GRAPH
METER F.S
×1,000
×2,000
×5,000
×10,000
×20,000
×50,000
200μ"
100μ"
40μ"
20μ"
10μ"
4μ"
5.0μ
2.5μ
1.0μ
0.5μ
0.25μ
0.1μ
TALYSURF

Cutter Section

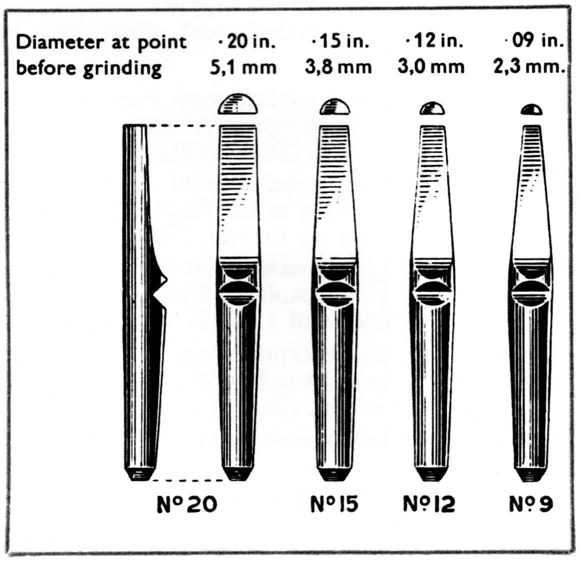
CUTTERS for Taylor-Hobson Pantograph Machines

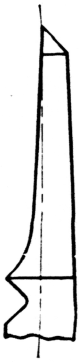
Single-edge cutters are normally supplied unsharpened and are available in various diameters as shown in Fig. 1.

They are held and centred accurately in the engraving machine spindle by a taper shank. The central notch enables the cutter to be removed from the spindle with a special cutter wrench.

The cutters are made in four grades of steel and in two different forms, Rigiflat and Axiflat.

Fig. 1



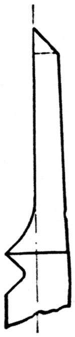


Rigiflat

Fig. 2

Rigiflat Cutters

Rigiflat cutters have their flats tapered about 3° to the axis, as shown, to increase their rigidity, and are preferable for heavy and general work.



Axiflat

Fig. 3

Axiflat Cutters

Axiflat cutters have their flats ground accurately to the cutter axis throughout, so that it is unnecessary to grind the flats when sharpening the cutters. They are convenient for light cuts.

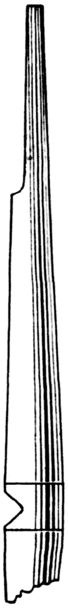


Fig. 4

Carbon Steel No. 9 Rigiflat Form

This cutter is a single-edge cutter made in Carbon Steel No. 9 Rigiflat Form. It has a blade, 2 in. (51 mm) long, and is useful for light work at abnormal depths, etc.

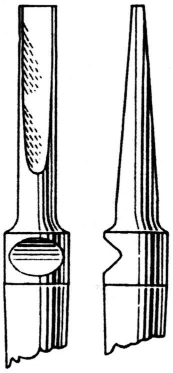


Fig. 5

No. 12TH

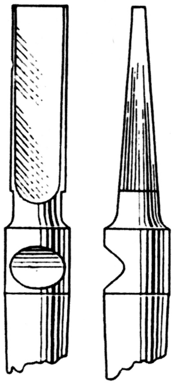


Fig. 6

No. 20TH

Twin Edge Cutters Speedicut High Speed Steel

These are twin-edge cutters made in Speedicut High Speed Steel, in two sizes, Nos. 12TH and 20TH. They are used for light milling and routing processes, and give a more balanced cut on heavy cutting than the single-edge types.

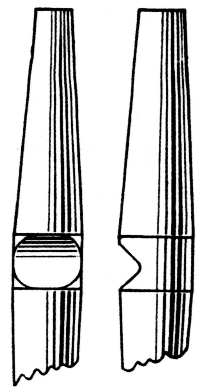


Fig. 7

No. 12CH

Taper Cylindrical Form

Speedicut High Speed Steel

The taper cylindrical form of this cutter can have flats ground on it for use as a "pyramid" type of cutter. By grinding a cylindrical step on the end it may also be used as a setting plug for locating jigs and fixtures, etc. in relation to a master copy. The cutter is made in Speedicut High Speed Steel, No. 12CH.

The Choice of Cutter

The requirements of each particular job are too varied to lay down any hard and fast rules, but as a preliminary guide reference should first be made to the chart on Page 14.

For line engraving, that is, engraving produced by the single width or part of the width of the cutter, the form may be a conical one, as shown in Fig. 8.

The included angle of the cone is normally 90°. Many variations may be obtained by altering the cone angle and the width of the flat (truncation) on the end of the cutter. When the engraving is to be filled with a wax filler, the cone angle should not exceed 60° (included angle).

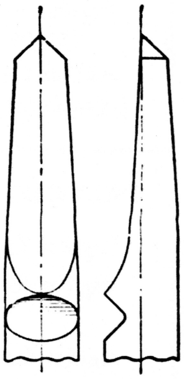


Fig. 8

The conical point whose cut is like that of the common hand graver and is used for engraving finished work without burr.

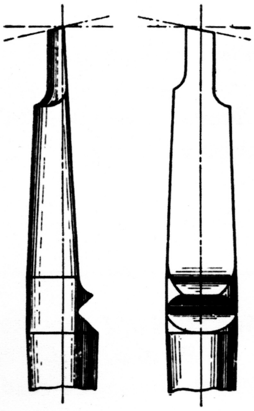


Fig. 9

Parallel cutter as ground on the Type 'D' Cutter Grinding Machine or the 'CX' Cutter Grinding Attachment, used with 'CX', 'CXL' and 'D' Pantograph Machines.

For relief or sunk engraving, and light milling operations, where comparatively large areas of metal have to be cleared away, it is more usual to resort to the parallel type of cutter, see Fig. 9. It is advisable to avoid using truly parallel cutters where possible as they have a tendency to throw up a burr.

Cutters with truly parallel ends, as shown in Fig. 9, can only be ground on the Type 'D' Bench Cutter Grinder, or the Cutter Grinding Attachment. The Cutter Grinding Attachment offered for use with the Model 'A' Bench Machine is only capable of producing the modified form as shown in Fig. 10. This is because the cutting edge is ground on the periphery of the grinding wheel.

For light end milling and routing processes, see Figs. 5 and 6.

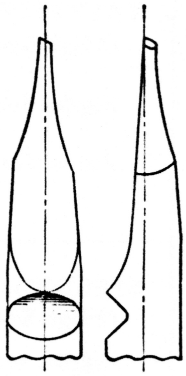
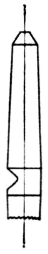
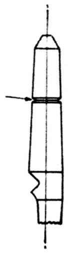
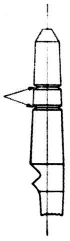
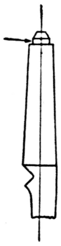


Fig. 10

The parallel or slightly conical point as ground on attachment supplied for Model 'A' machines.

Cutters are supplied in boxes of six, and this is the minimum quantity which can be supplied. Additional quantities can only be supplied in multiples of six. An exception is made in the case of Carbide Tipped Cutters and Diamond Cutters which are supplied singly.

CUTTERS for Taylor-Hobson Pantograph Machines

Types of Cutter (stocked unground)	*Sizes*	*Code Number*	*Identified by markings on shank thus:*	*Cutters recommended for use on:*
CARBON STEEL			 Plain Shank	Brass, Copper, Copper Alloys and the softer metals. Plastics Also a fair life on Steel and Iron.
*Rigiflat form sharpened 90°	No. 9	110/156		
Rigiflat form	No. 9	110/143		
Rigiflat form (blade 2 in. (51 mm))	No. 9	110/147		
Axiflat form	No. 9A	110/146		
†Axiflat form sharpened 90°	No. 9A	110/154		
TALYCUT STEEL			 Turned Ring	Same materials as Carbon Steel Cutters, but this Steel shows a life of from 3 to 5 times that of the cheaper Carbon Steel.
Rigiflat form	No. 9T	110/377		
Rigiflat form	No. 12T	110/161		
Axiflat form	No. 9AT	110/151		
†Axiflat form sharpened 90°	No. 9AT	110/153		
TALYSPEED STEEL (High Speed)			 Two Turned Rings	Cast Iron, Mild Steel and Tool Steel. Useful also on Plastics, if Carbon and Talycut Steels soften too readily through excessive heating.
Rigiflat form	No. 12F	110/165		
Axiflat form	No. 15AF	110/167		
SPEEDICUT STEEL (High Speed)			 Step turned at small end	Cast Iron, Mild Steel and Tool Steel. Useful also on Plastics, if Carbon and Talycut Steels soften too readily through excessive heating; also for Stainless Steel and Stainless Iron. (Ask for advice regarding procedure.)
Rigiflat form	No. 12H	110/163		
Rigiflat form	No. 20H	110/164		
Axiflat form	No. 12AH	110/464		
Twin Edge Cutters ...	No. 20TH No. 12TH	110/465 110/466		
Cylindrical Cutter ...	No. 12CH	110/467		

CUTTERS SUPPLIED SHARPENED READY FOR USE TO ORDER

*RIGIFLAT CUTTERS pointed at 90°, 60° or 30°, ready for use.

†AXIFLAT CUTTERS pointed at 90°, 60° or 30°, ready for use.

RIGIFLAT and AXIFLAT also can be ground parallel to specified sizes.

NOTE—90° Cutters are suitable for 'unfilled' engraving; 60° and 30° Cutters are suitable for engraving to be filled.

AXIFLAT CARBIDE TIPPED CUTTERS

Sharpened 60 (·005 in. truncation)	Code No. 110/817
Unsharpened parallel diam. ·17 in.	Code No. 110/818
Unsharpened parallel diam. ·13 in.	Code No. 110/822

DIAMOND CUTTERS. Please ask for advice in connection with Diamond Cutters.

COPYHOLDERS for Pantograph and 'JH' Machines

Copyholders

Copyholders are made in sizes as listed having an annular seating face and are secured to the head on the machine with one fixing bolt.

All Copyholders excepting 24 in. (610 mm) long may be rotated on seating face to any desired angle and, for setting the grooves accurately parallel or at right angles to the tee-slots in the work-table, adjustable stop screws are provided which bear against abutment pads on the Copyholder in the two positions. Each Copyholder is supplied with the special copy clamps for locating the copy endwise in the dovetail grooves.

TEE SLOT COPYHOLDERS

The No. 0 Copyholder, which fits all machines, will hold flat square-edged special copy. It measures 16 × 9 in. (406 × 229 mm) and has $\frac{3}{8}$ in. (9,6 mm) Tee slots.

Tee Slot Copyholder 110/678, which fits the JH machine has four $\frac{3}{8}$ in. (9,6 mm) Tee slots on $5\frac{3}{4}$ in. (146 mm) pitch. It measures 20 × 12 in. (508 × 305 mm).

INTERCHANGEABLE COPYHOLDERS FOR MODELS 'A', 'D', 'CX' and 'CXL' PANTOGRAPH MACHINES AND 'JH' MACHINES

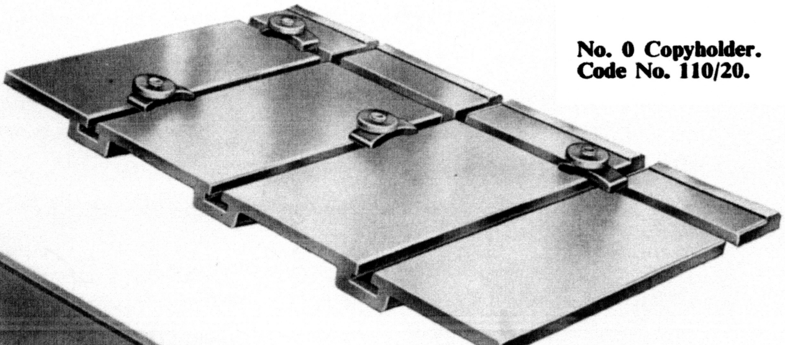
No.	*Number of grooves*	*Length*	*To take Standard Copies Nos.*	*Code No.*
2	3	16 in. (406 mm)	2A, 2C, 2L	110/22
2X	5	16 in. (406 mm)	2A, 2C, 2L	110/221
2X	5	24 in. (610 mm)	2A, 2C, 2L	110/602
3	1	16 in. (406 mm)	3A, 3C	110/24
4	1	16 in. (406 mm)	4	110/26
5	2	16 in. (406 mm)	5A, 5C, 5L	110/28
5X	3	16 in. (406 mm)	5A, 5C, 5L	110/222
5X	3	24 in. (610 mm)	5A, 5C, 5L	110/603

INTERCHANGEABLE COPYHOLDERS FOR MODEL 'C' MACHINE

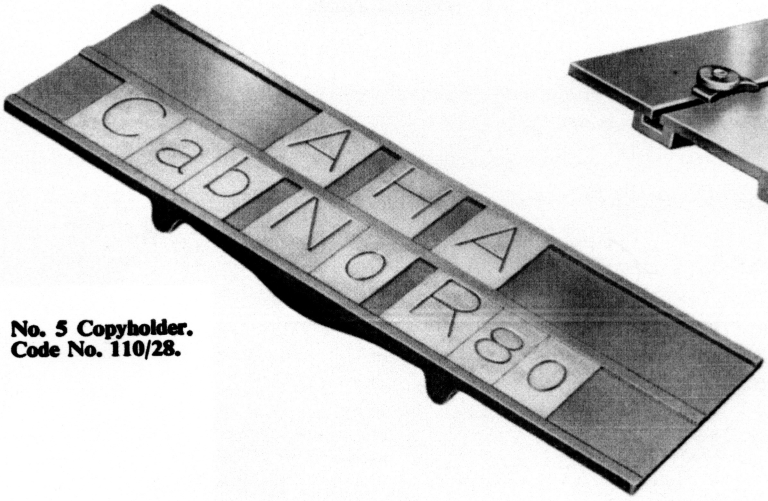
No.	*Number of grooves*	*Length*	*To take Standard Copies Nos.*	*Code No.*
2	3	16 in. (406 mm)	2A, 2C, 2L	110/22
3	1	16 in. (406 mm)	3A, 3C	110/24
4	1	16 in. (406 mm)	4	110/26
5	2	16 in. (406 mm)	5A, 5C, 5L	110/28

INTERCHANGEABLE COPYHOLDERS FOR MODEL 'JH' MACHINE

No.	*Number of grooves*	*Length*	*To take Standard Copy Nos.*	*Code No.*
2 JH	8	20 in. (508 mm)	2A, 2C, 2L	110/675
3 JH	3	20 in. (508 mm)	3A, 3C	110/676
5 JH	4	20 in. (508 mm)	5A, 5C, 5L	110/677



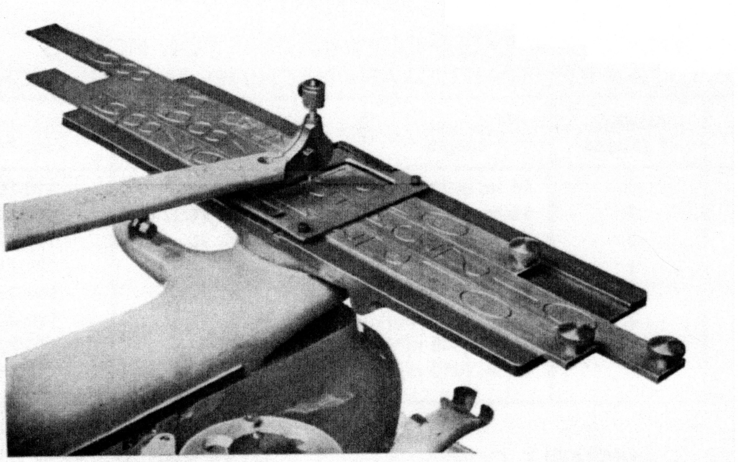
No. 0 Copyholder.
Code No. 110/20.



No. 5 Copyholder.
Code No. 110/28.

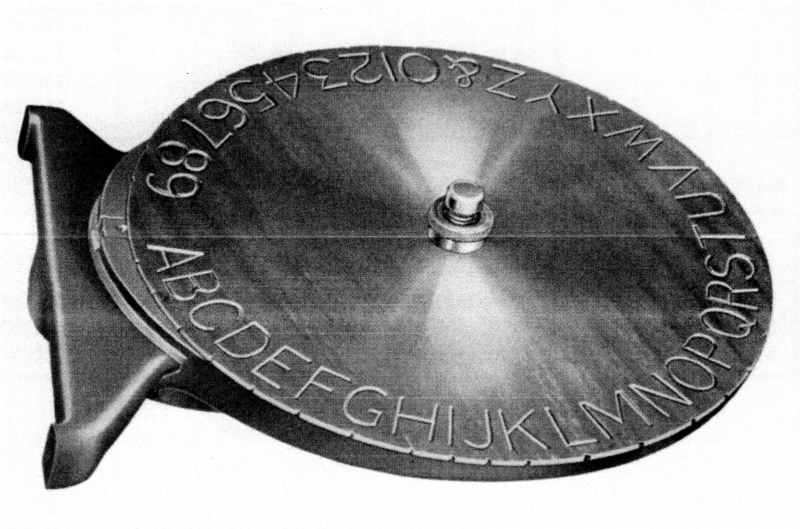
SPECIAL NOTE
Models 'C', 'CX', 'CXL' machines are now discontinued, but accessories are available.

Copyholders



Special Copyholders

Special Copyholders can be useful to save time in manufacturing operations, as in the one illustrated for consecutive numbering.


ABCDEFGHIJKLMNOPQRSTUVWXYZ&0123456789

Circular Copyholder

Code No. 110/30

The Circular Copyholder is interchangeable with all the Copyholders shown on page 15. It provides a means by which characters may be successively engraved on discs, cylinders, etc., and is generally used with the Dividing Head.

The copy characters are engraved on circular discs which fit on to the copyholder as shown. Standard Copy Discs are available carrying the letters A—Z and the figures 0—9, in either 'A' or 'C' style Line Copy, or both, and also in reverse. Special Copy Discs can be supplied to order. Notches round the edge of the discs engage on a spring pawl, the pawl is released by pressure on the central knob.

MADE IN GREAT BRITAIN
PORTER AND HARDING LTD EDINBURGH AND LONDON
FEAR NAUGHT

Copy Tray / Rollers & Style

Copy Tray

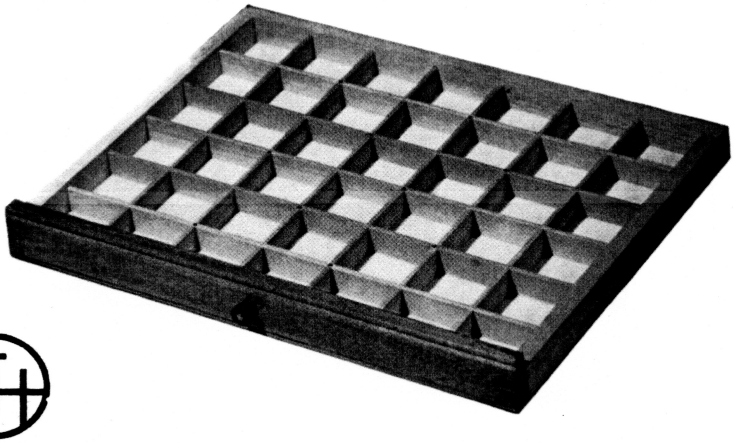
Code No. 110/623 (Factored)

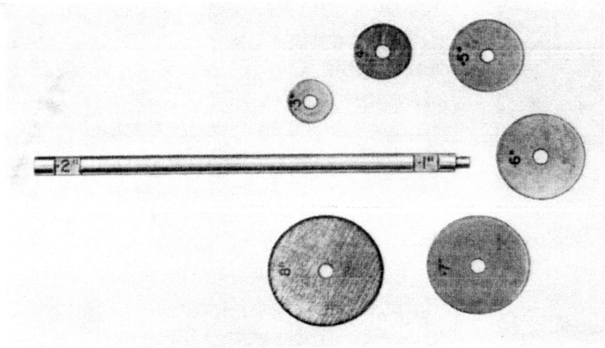
This is a wooden tray, divided into 42 sections for the convenient storage of No. 2 Line Copy.

Used as a drawer it will fit into a small tool cabinet.

Dimensions: 13¼ × 10¼ × 1 in. (337 × 260 × 25 mm).
Height of polished front: 1½ in. (38 mm).
Depth of compartment: 1¾ in. (44 mm).

A twelve-drawer cabinet can be supplied to order.

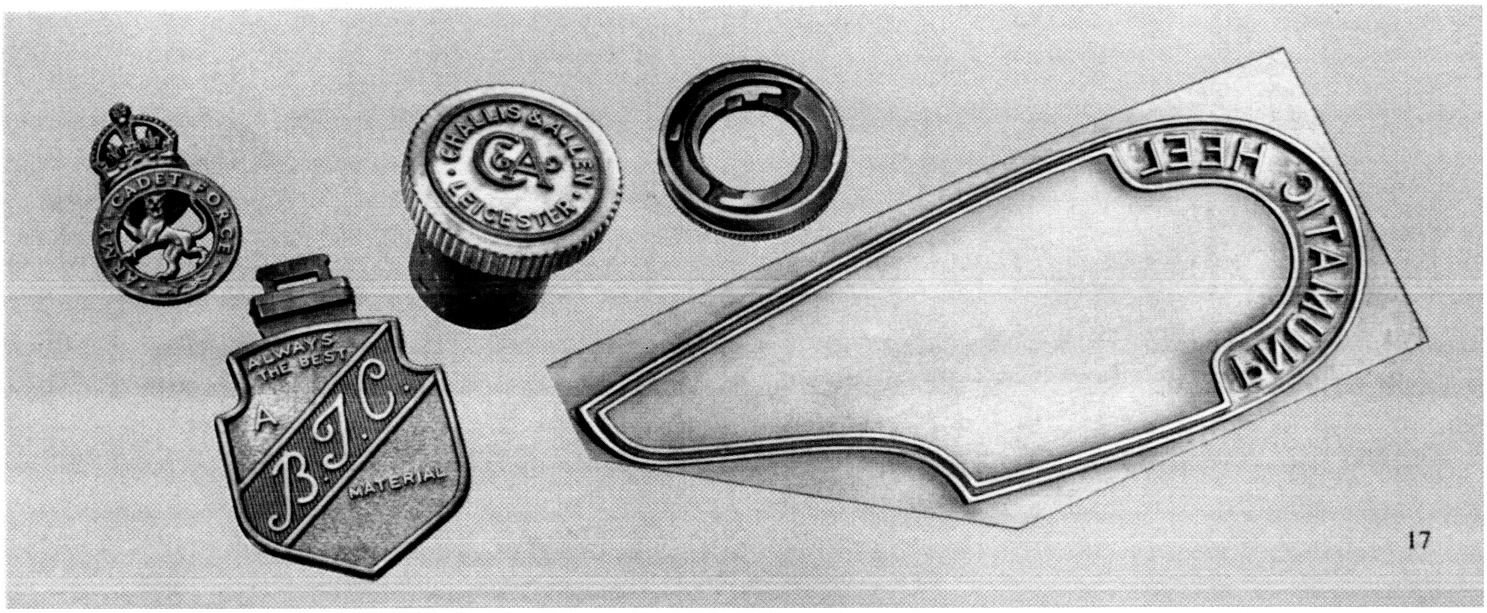




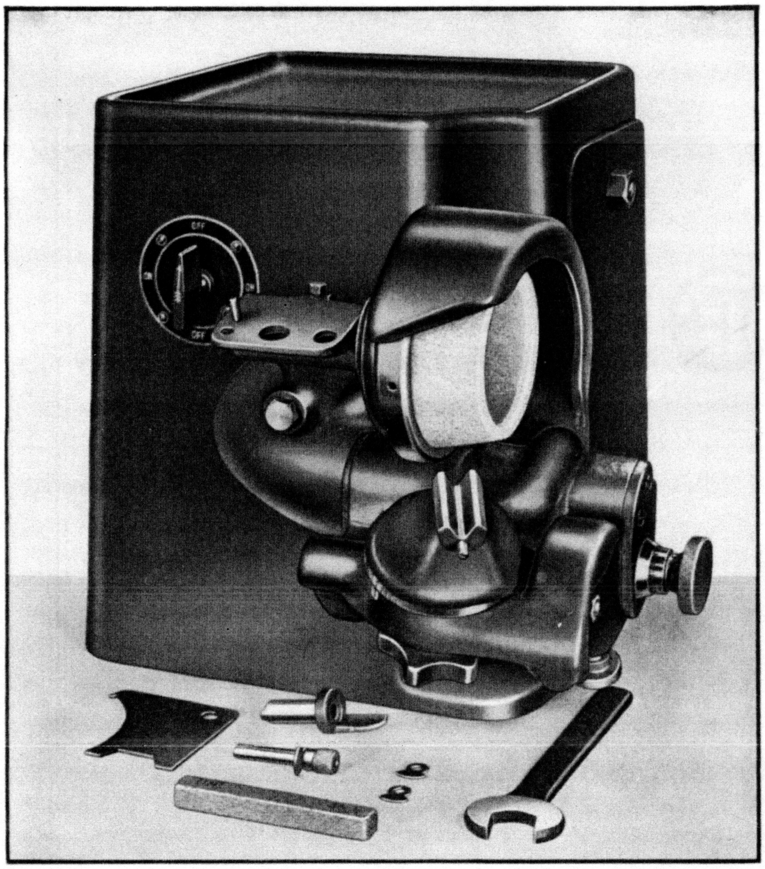
Rollers and Style

Code No. 110/66

Used to guide the pantograph around raised or sunk copy. A range of Rollers are supplied to correspond with the diameter of the cutter used.


ARMY CADET FORCE
CHALLIS & ALLEN
C&A
LEICESTER
ALWAYS THE BEST
A
B.T.C.
MATERIAL
PNUMATIC HEEL

Cutter Grinders



Net Weight	*Approx. 95 lb. (43 kg.)*
Gross Weight	*Approx. 115 lb. (52 kg.)*
Shipping Dimensions	*22 × 24 × 18 in.* *(559 × 610 × 457 mm)*

Type 'D' Cutter Grinder

Code No. 110/353–S

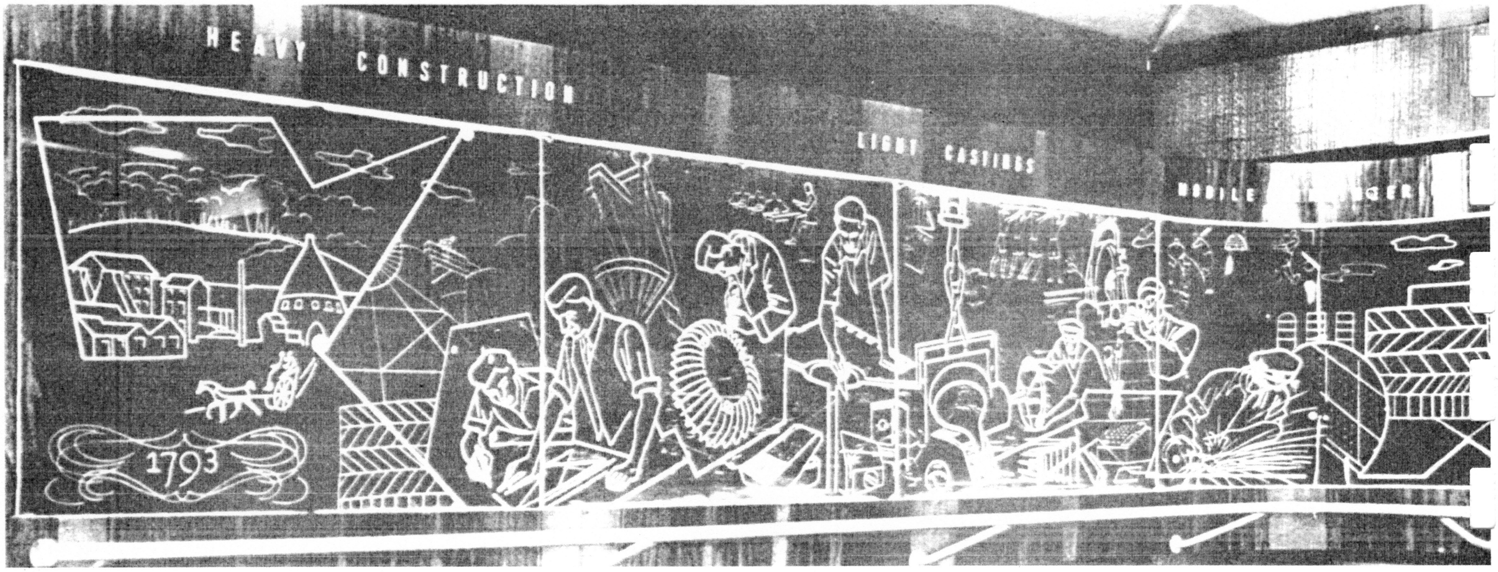
In all engraving, the ultimate quality of the work produced on an Engraving Machine, is determined by the skill in the grinding of the cutter. The Taylor-Hobson Type 'D' Cutter Grinder enables users to grind cutters to a required size and shape and obtain precision results, without disturbing the machine setting and without employing skilled labour. The Cutter Grinder is sturdily built for bench mounting and all moving parts are adequately protected from abrasive dust. It is simple and safe to operate.

The setting gauge and set of locating cams for the cutter holder provided with the Cutter Grinder ensure precise grinding of the clearance angle. Cams normally provided are for clearance angles of 20°, 24°, 32° and 40°.

In use, the locating cam attached to the cutter holder engages on a stop pin on the tool rest, and limits the angle through which the cutter can be rotated whilst grinding.

The feed screw is graduated so that each increment represents ·002 in. (0,051 mm) on the cutter diameter, allowing for accurate grinding of the cutter diameter.

For all Engraving Machines

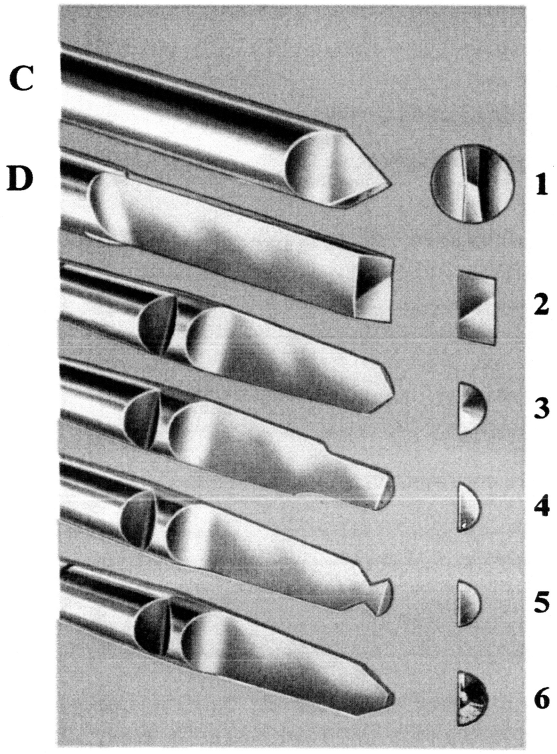


Cutter Grinders

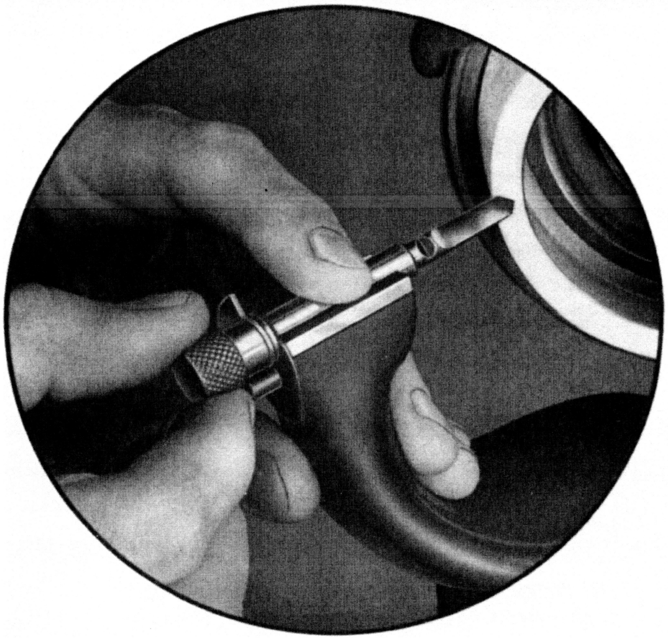
The crutch which carries the tool rest can be rotated for grinding the required shape on the end of the cutter. A scale and lock are provided. The cutter is rocked across the face of the wheel during grinding.

Special cams are required when grinding cutters with twin cutting edges (cutters C and D).

When ordering please state voltage, frequency and phase of electricity supply.

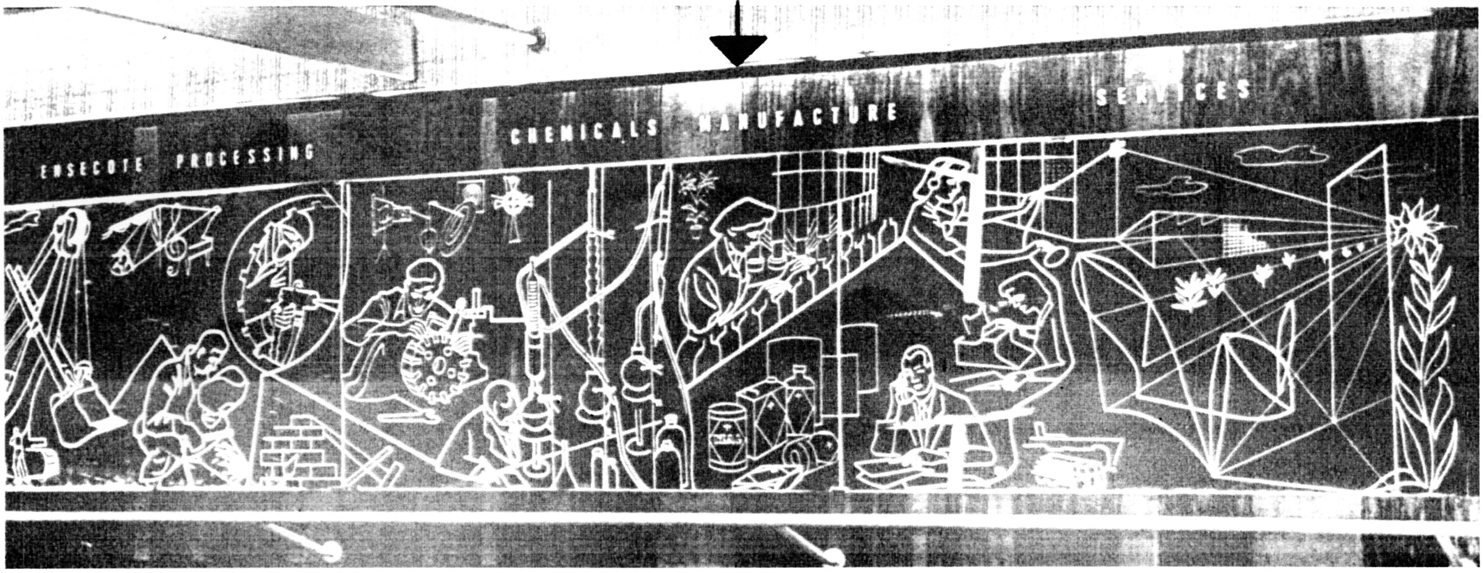


Type 'D' Cutter Grinder will grind the range of Cutters as shown



The enlarged view of the tool rest shows the Cutter Holder in greater detail. The locating cam on the end of the Cutter Holder and locating pin in the tool rest can clearly be seen. These limit the rotation of the Cutter Holder thus controlling the clearance angle on the cutter.

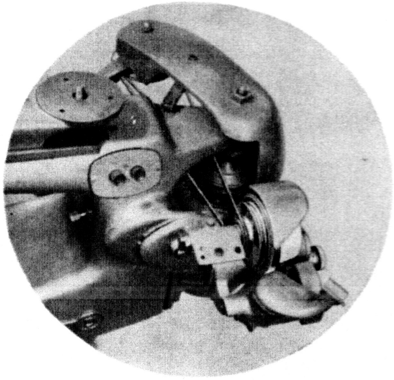
Eight perspex panels, size 30 × 24 in. (762 × 610 mm) with designs by John Farleigh engraved direct on each by Taylor-Hobson 'CX' Engraving Machine, and displayed as decor at the Works of Newton Chambers & Co. Ltd., Thorncliffe, Sheffield. The Engraving was executed by Parco Industries, Horsham.



Cutter Grinders

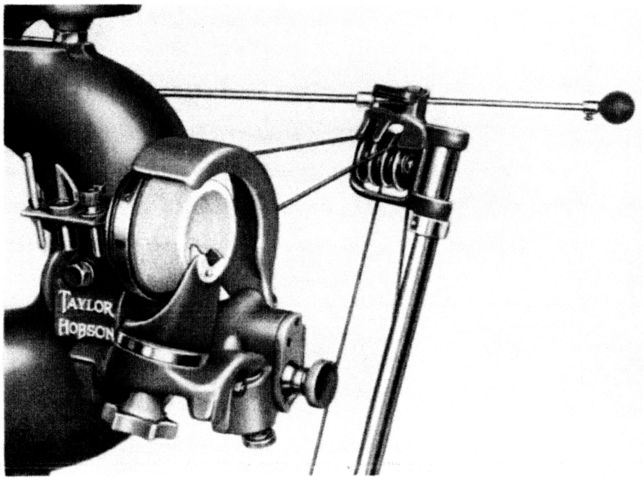
'CX' Cutter Grinding Attachment

Code No. 110/227
for model 'D'



For the user of Taylor-Hobson models 'D', 'CX' or 'CXL' Pantograph Machines we supply the 'CX' Cutter Grinding Attachment, which will grind Cutters Nos. 1, 2, 3, 4, 5 and 6 (page 19). This comprises the standard grinding unit only of Type 'D' without the self-contained motor. The 'CX' Cutter Grinding Attachment is driven by the motor of the Engraving Machine.
The actual grinding of cutters on this attachment is identical with that of Type 'D' but the Engraving Machine is out of production whilst grinding is in progress.

Net Weight .. .. Approx. 22 lb. (10 kg.)
Gross Weight, in case .. Approx. 46 lb. (21 kg.)
Shipping Dimensions
Approx. 22 × 12 × 10 in. (559 × 305 × 254 mm)



Code No.
110/227-S

Type 'A' Cutter Grinding Attachment

Code No. 110/841-S

The 'one-machine-only' user of Taylor-Hobson 'A' Bench Pantograph Machine may, for economy reasons, choose this simple attachment as illustrated. Providing the operator is sufficiently skilful, cutters can be ground successfully, but this depends entirely upon how the cutter is held and maintained manually in position whilst grinding proceeds. Cutters similar to those illustrated in Figs. A and B can be ground, or any angle between, but parallel cutters cannot be ground on this attachment.

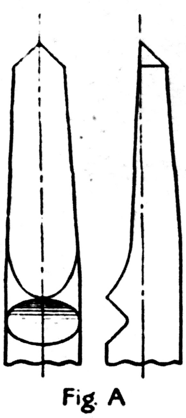


Fig. A

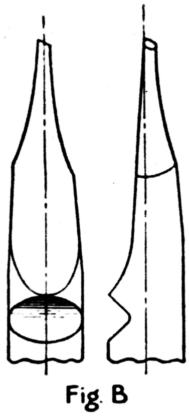
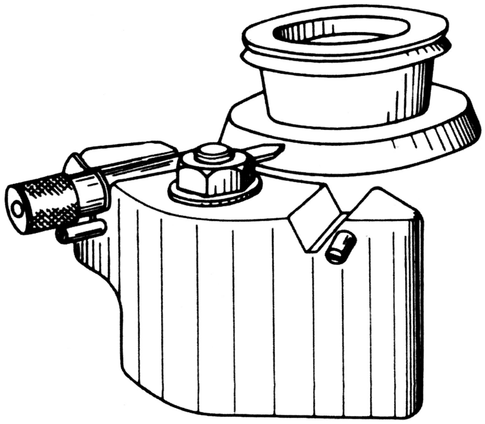


Fig. B



Cutter Measuring Microscope

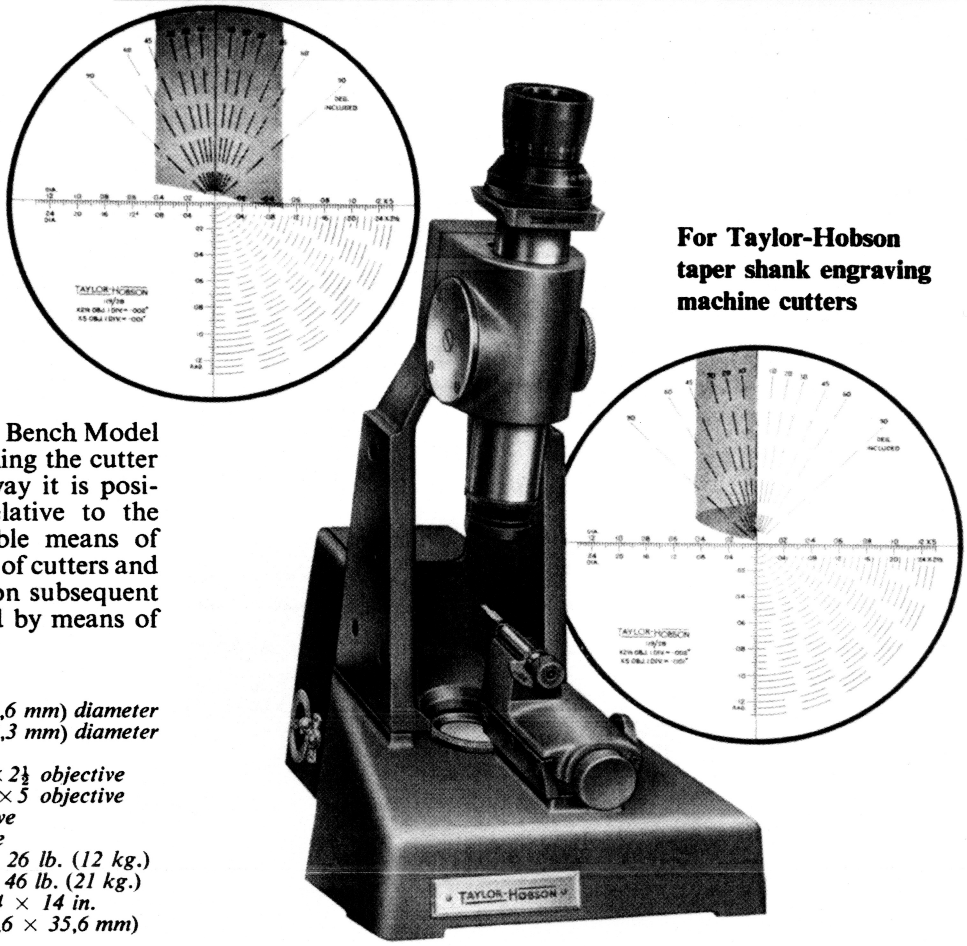
Code No. 112/292 112/293

The Cutter Measuring Microscope, Bench Model is provided with means of positioning the cutter to be measured in precisely the way it is positioned in the Cutter Grinder relative to the grinding wheel. It is an invaluable means of checking the shape and dimensions of cutters and makes possible exact duplication on subsequent grindings. Illumination is provided by means of a 12 volt lamp and green filter.

SPECIFICATION

Magnification × 25 .. Field ·30 in. (7,6 mm) diameter
Magnification × 50 .. Field ·17 in. (4,3 mm) diameter
Graticule Graduations
English { ·002 in. (0,051 mm) with × 2½ objective
·001 in. (0,025 mm) with × 5 objective
Metric { 0.051 mm with × 2½ objective
0.025 mm with × 5 objective
Net Weight .. .. .. Approx. 26 lb. (12 kg.)
Gross Weight .. .. .. Approx. 46 lb. (21 kg.)
Shipping Dimensions .. .. 14 × 14 × 14 in. (35,6 × 35,6 × 35,6 mm)

A Bench model Cutter Measuring Microscope, for both parallel shank and taper shank cutters is also available. (Code No. 112/292, 112/302).


DEG. INCLUDED
DIA
RAD
12 X 5
24 X 2½
TAYLOR-HOBSON
X2½ OBJ. I DIV = ·002"
X5 OBJ. I DIV = ·001"
TAYLOR-HOBSON

For Taylor-Hobson taper shank engraving machine cutters

T.F.BLUMFIELD LTD.
BIRMINGHAM.

Accessories

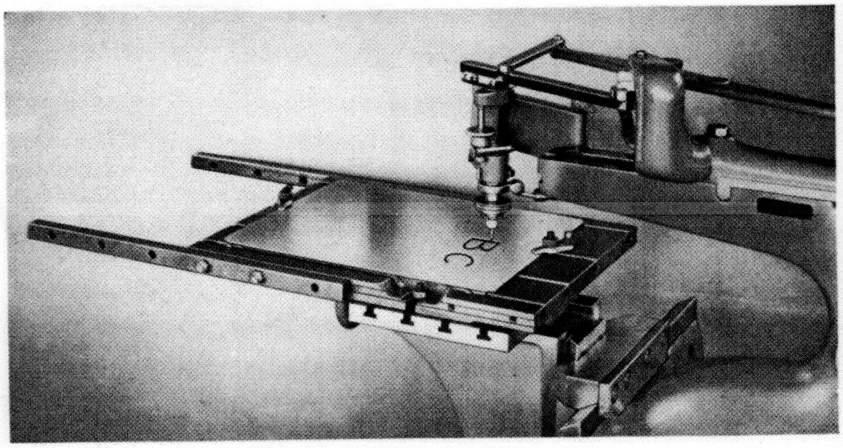
Extension Table

Code No. 110/216-S

The Extension Table for all Engraving Machines enables large plates up to 18 in. wide to be securely held on the Engraving Machine table. Work up to 36 in. (914 mm) wide can be engraved in all parts by reversing the plate.

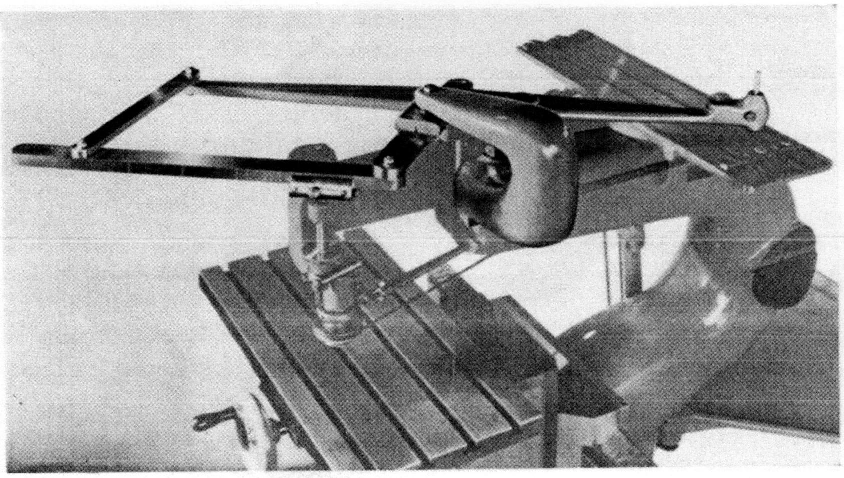
The Extension Bars also shown are a useful addition to the table, making it possible to support plates 30 in. (762 mm) wide.

EXTENSION BARS, one pair, with fixing screws. Code No. 110/240.



Extension Table
Net Weight 45 lb. (20,4 kg.)

Extension Bars
Net Weight per pair 6½ lb. (2,9 kg.)



1:1 Pantograph

for models 'CX' and 'CXL' machines
Code No. 110/232

A special Pantograph is available for the obsolete 'CX' and 'CXL' Machines which covers reductions between 1 : 1 and 6 : 1. The use of this Pantograph necessitates the use of a special machine head which replaces the standard machine head; this special head is provided with the Pantograph. Using this Pantograph, characters 3 in. (76 mm) high can be engraved from standard No. 3 line copy.

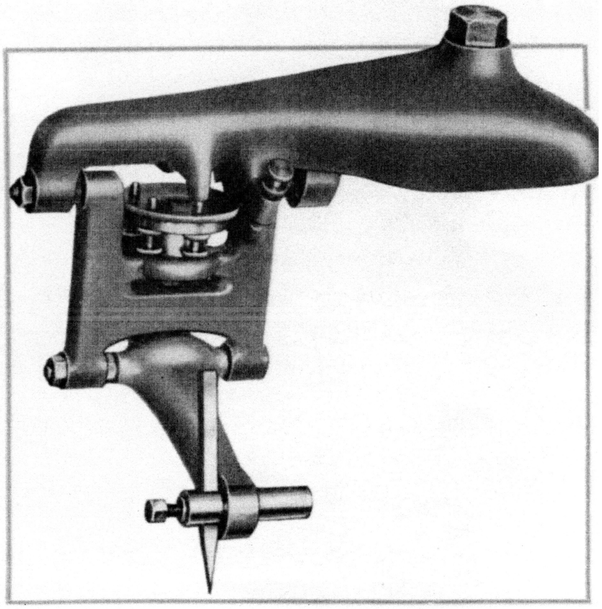
Net Weight 33 lb. (15 kg.)

Knife Divider

Code No. 110/87

The Knife Divider is an attachment to 'D' 'C', 'CX' and 'CXL' Pantograph Machines, for ruling fine lines that cannot be made with a revolving cutter. It is fitted to the machine in place of the standard head. The lengths of line that can be ruled are adjustable up to a maximum of 1½ in. (38 mm) and controlled by a turret of changeable stops.

Net Weight 10 lb. (4,5 kg.)

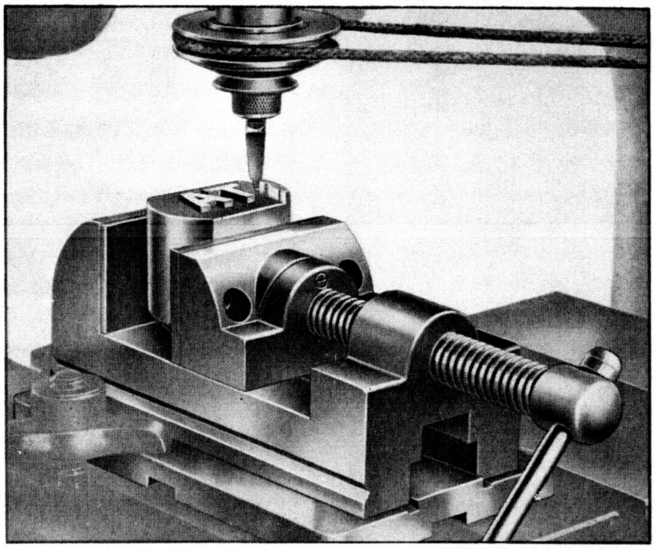


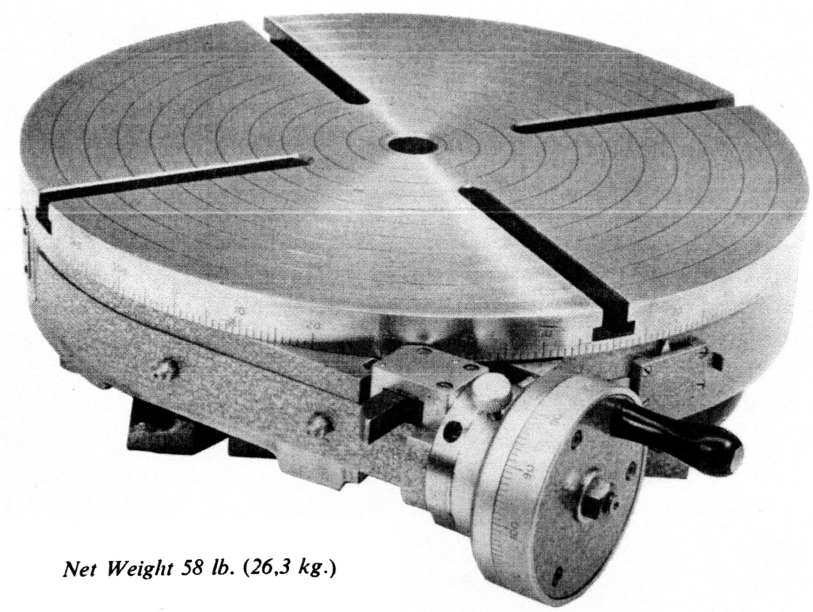
Machine Vice

Code No. 110/17 (Factored)

The Machine Vice for all Pantograph Machines for holding objects by their sides is clamped to the table by means of the standard dogs, and may be squared by means of the fence, either parallel with or at right angles to the slots in the table. The jaws, of hardened steel, are 2 in. (51 mm) wide, 1¼ in. (32 mm) deep, and open to 2 in. (51 mm). A spare jaw, having V grooves to hold cylindrical work on end or side is provided with each vice.

Net Weight 6½ lb. (2,9 kg.)





Net Weight 58 lb. (26,3 kg.)

Circular Table

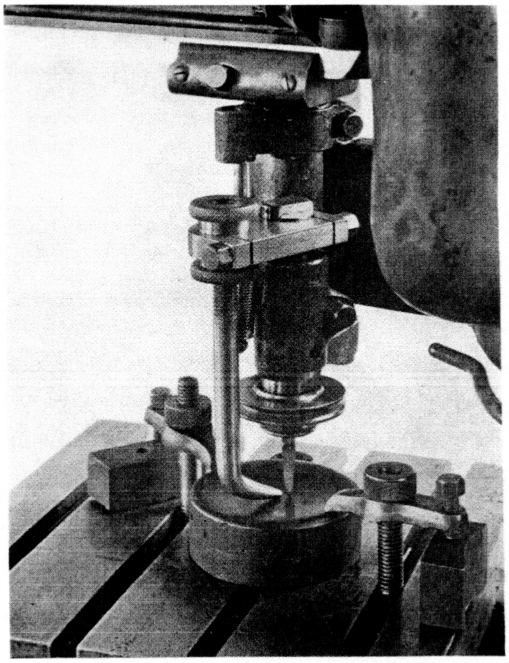
Code No. 110/706-S

The Circular Table is for engraving and dividing circular work such as dials. It is also useful in the toolroom when accurate measurements of rotation have to be made. Slots in the base enable the Circular Table to be clamped to the machine work table using the table T slots and fittings. The 12 in. (305 mm) diameter Table is rotated by a worm, the index of which is graduated in minutes of arc; one turn of the worm corresponds to two degrees. The slots in the face plate will accommodate the machine table fittings.

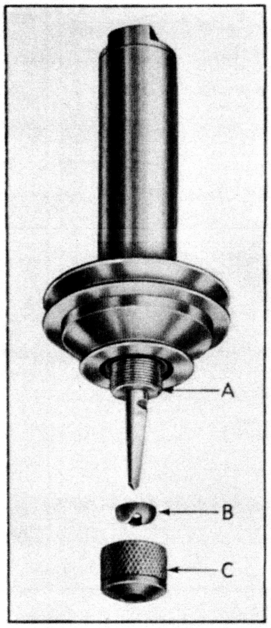
Presser Foot

Code No. 110/230 for models 'C', 'CX' and 'CXL' machines
Code No. 110/828 for model 'D' machines

The Presser Foot for 'D' 'C', 'CX', and 'CXL' Pantograph Machines is a hardened steel gauge which rests on the work surface near the cutter and gauges the depth of cut over slightly undulating surfaces or thin materials which are apt to buckle.
It does tend to mark the work surface and should only be used when there is a finishing operation after engraving.



Spindle — Fillers



Ball Bearing Spindle
Code No. 110/374
Fig. 1

Taper Cutter Ball Bearing Spindle

Code No. 110/825 for models 'A' and 'D' machines
Code No. 110/374 for 'C', 'CX' and 'CXL' machines

The standard spindle is spring loaded so that there is no radial or end shake and no adjustment is necessary. It is packed with special grease to permit of speed up to 15,000 r.p.m. without overheating. For heavy work it is provided with a screwed cap C which with retainer B keeps the cutter in place.

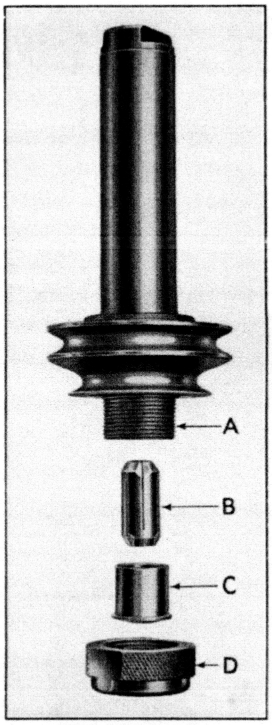
Net Weight 1 lb. (0,45 kg.)

Parallel Ball Bearing Spindle

Code No. 110/826 for models 'A' and 'D' machines
Code No. 110/264 for models 'C', 'CX' and 'CXL' machines

A special spindle can be provided to take parallel shank cutters. It consists of the spindle with large screwed nose A, collet B (in sizes $\frac{1}{8}$ in. (3,2 mm), $\frac{3}{16}$ in. (4,8 mm) and $\frac{1}{4}$ in. (6,3 mm)) collet closer C and screwed cap D.

Net Weight 1 lb. (0,45 kg.)



Ball Bearing Spindle
Code No. 110/264
Fig. 2

'Kwilkfyl' Filler

'Kwikfyl' is a hard adhesive filler especially adapted for filling light engraving on metal, vulcanite, bakelite, etc., after the surface has been finished. It is applied warm, sets at once and does not shrink. 'Kwikfyl' is supplied from stock in boxes containing two or more sticks of any one of the following colours:

Code No. 110/131 White
Code No. 110/116 Yellow
Code No. 110/130 Blue
Code No. 110/115 Green
Code No. 110/129 Red
Code No. 110/128 Black
Code No. 110/112 Silver
Code No. 110/113 Gold

TRADE MARK
TAYLOR-HOBSON
KWIKFYL
Wax Filler for light engraving on Metal
Vulcanite · Bakelite · Ivorine · etc.
TAYLOR, TAYLOR & HOBSON, LEICESTER, ENGLAND
KWIKFYL
TH
KWIKFYL

When ordering, only the Code No. and number of sticks required should be specified.

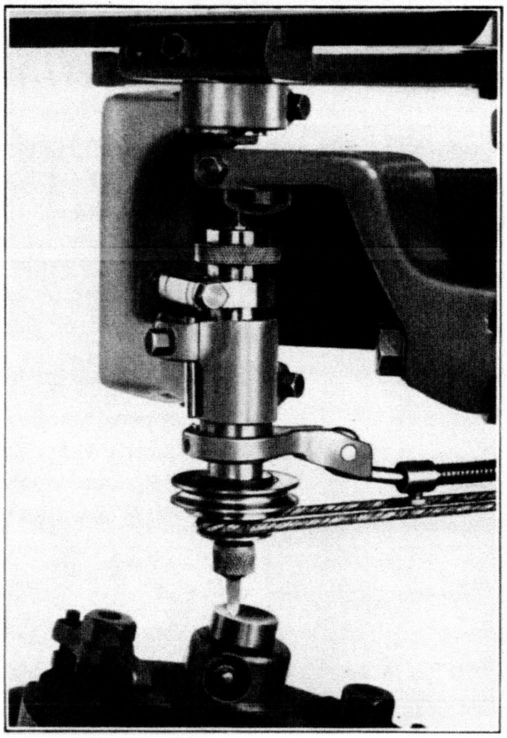
'Durafilla' Filler

Where wide lines in metal are to be filled, as for example in door plates and memorial brasses, we recommend 'Durafilla'. 'Durafilla' is supplied in sticks in a variety of colours with instructions for use.
It cannot be applied to work with finished surfaces.

'Durafilla' Stocked in:

Code No. 110/77	Black
Code No. 110/327	White
Code No. 110/76	Red
Code No. 110/468	Blue
Code No. 110/469	Green

Forming/Milling Attachments



Forming Attachment for 'CX' and 'CXL' machines

Code No. 110/233

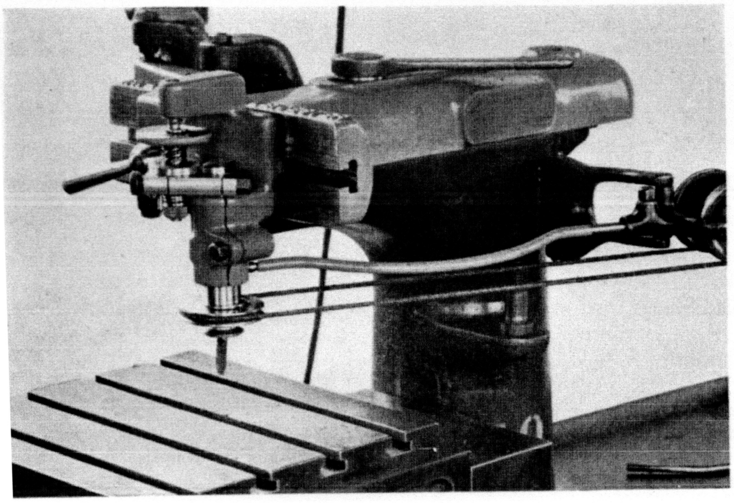
Net Weight
Forming Attachment for 'CX' and 'CXL'
3¼ lb. (1,5 kg.)

Forming Attachments

Code No. 110/233 for 'CX' and 'CXL' machines
Code No. 110/829 for 'A' and 'D' machines

The Forming Attachments provide a means by which the cutter can be guided over a curved or undulating work surface. The maximum depth of curvature is approximately ½ in. (12,7 mm) allowing for a depth of cut of up to ⅛ in. (3,2 mm).

The form of the work surface is transmitted to the cutter by a style moving under a former which is the exact counterpart of the work surface. The Forming Attachment carrying the feeler style at the top and the cutter spindle at the bottom, is spring loaded so that the feeler is always in contact with the former. Hence as the pantograph moves the spindle horizontally over the work, the Forming Attachment causes the spindle to rise and fall to the same form as the work surface.



Vertical Milling Head

Code No. 110/231-S for 'C' machines
Code No. 110/827-S for 'D' machines

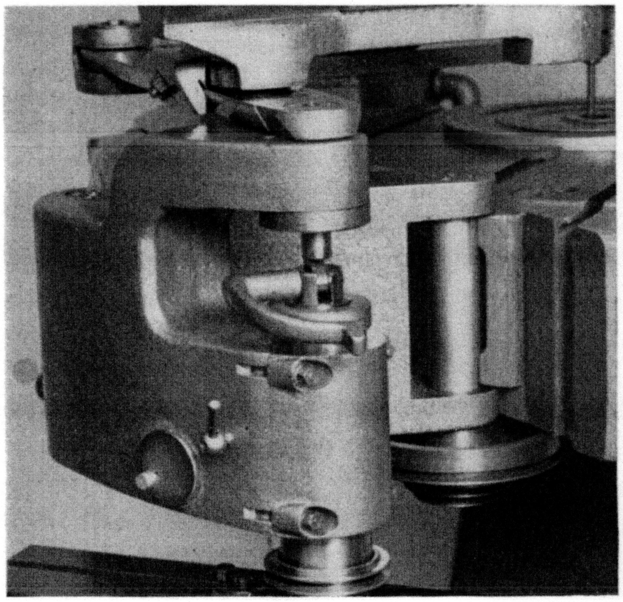
Machines as normally set up can be used as small high-speed precision millers. For heavier milling or routing which would tend to put undue strain on the pantograph, the Vertical Milling Head is extremely useful.

This attachment replaces the standard machine head and pantograph, and incorporates its own feed mechanism. The Machine drive and spindle are retained. The alternative spindle, for parallel shank cutters can also be used. In combination with the Circular Table or the Dividing Head it provides a precision index miller.

Net Weight 23 lb. (10,4 kg.)

Cam Type Feed / Forming Attachment

For 'JH' Engraver/Miller

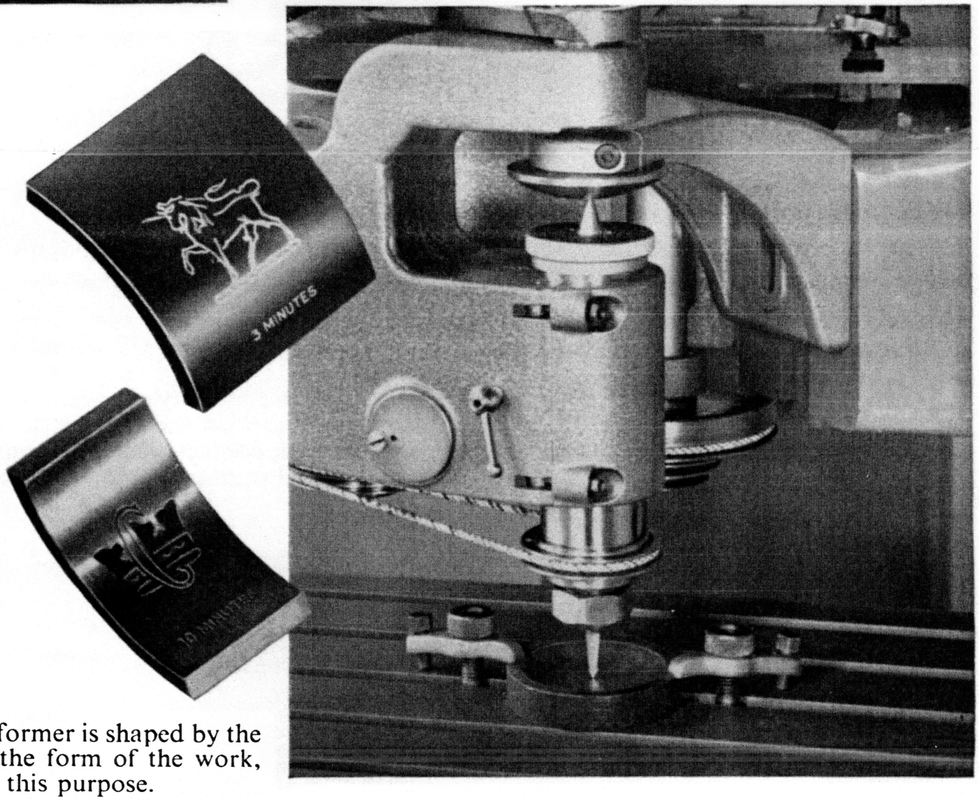


Cam Type Feed

Code No. 110/665

This is provided for use on light engraving, when a lever feed is preferred to the normal screw-action feed. Fitted in place of the normal knurled feed cap, the cam type feed provides a lever-operated feed of approximately ¼ in. (6,3 mm), together with an additional fine feed of approximately $\frac{1}{10}$ in. (2,5 mm). The fine feed is particularly valuable for maintaining an even width of cut on a surface which is not absolutely flat.

Net Weight 5 oz. (0,17 kg.)



Forming Attachment

Code No. 110/667

The forming attachment enables engraving to be carried out on curved or slightly contoured work. It consists of a bracket holding a former, together with a special cutter spindle feed cap. The feed cap incorporates a style which follows the former and imparts vertical movement to the cutter, horizontal movement being controlled by the pantograph in the usual way. The former is shaped by the user to the exact counterpart of the form of the work, former blanks being available for this purpose.

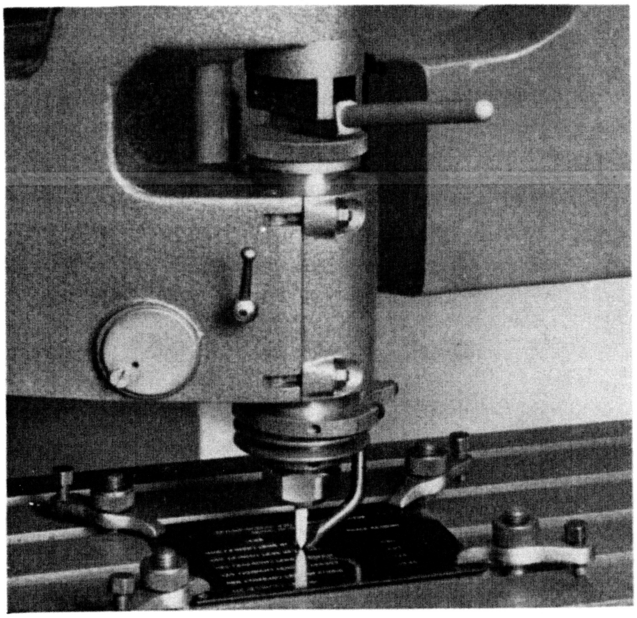
The maximum work area that can be covered with the forming attachment is a circle 2½ in. (63 mm) in diameter, and the maximum depth of contour permissible is ½ in. (12,7 mm).

The forming attachment includes the milling bracket (see opposite page).

Net Weight 4 lb. 12 oz. (2,2 kg.)

Presser Foot Feed / Milling Bracket

For 'JH' Engraver/Miller

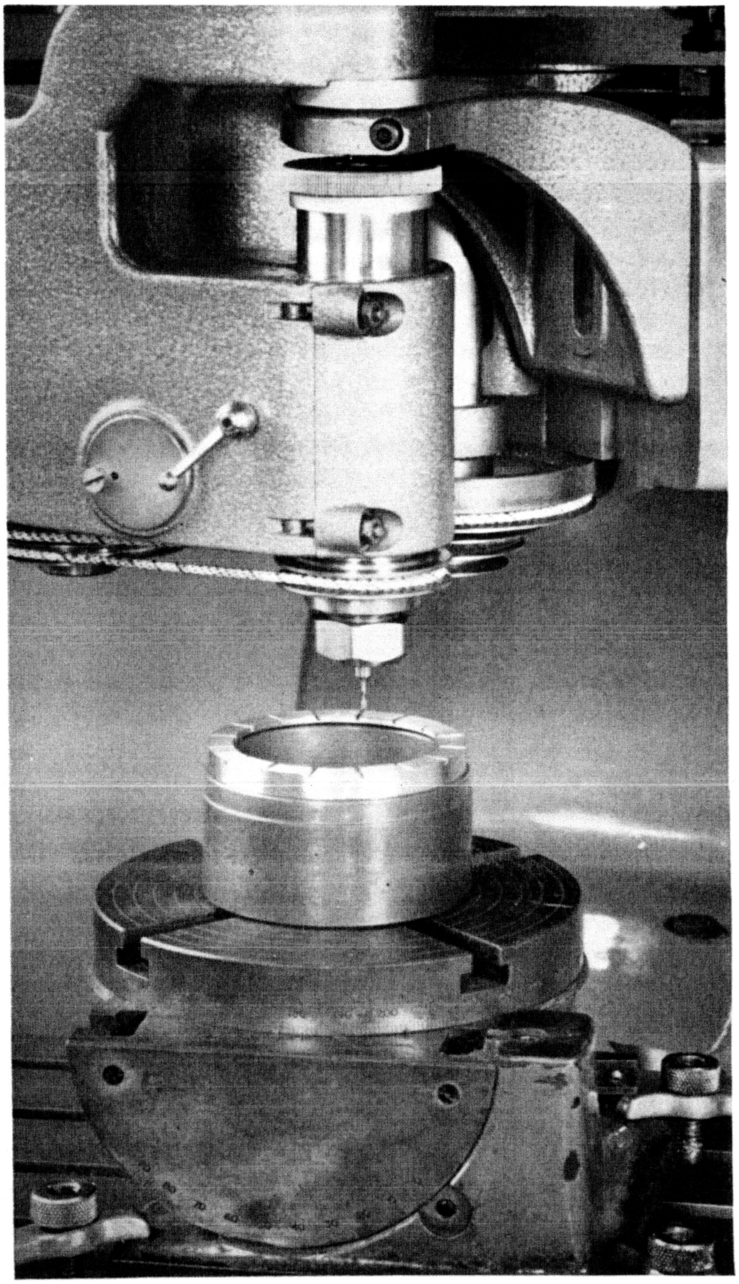


Presser Foot Feed

Code No. 110/666

The presser foot feed permits the cutter to rise and fall with the shape of the work surface without being forced into the work. It is intended for maintaining an even depth of cut over surfaces which undulate or are not flat, yet do not warrant the use of a forming attachment (see page 26). It also finds application on thin work having a tendency to buckle under the action of the cutter. The presser foot feed comprises a presser foot and a feed unit, both of which are readily fitted to the standard machine. As the presser foot is of hardened steel it has a tendency to scratch certain materials and should be used only where engraving is followed by a finishing operation.

Net Weight 1 lb. 6 oz. (0,65 kg.)



Milling Bracket

Code No. 110/668

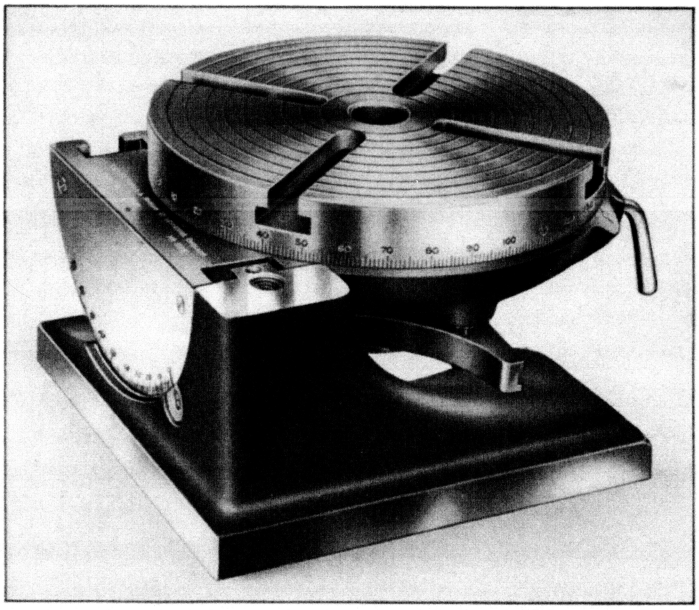
This attachment consists simply of a sturdy bracket which rigidly fixes the cutter spindle to the machine head, the pantograph taking no load. This enables heavier cuts to be taken than when the spindle is moved under pantograph control. With the milling bracket fitted, the 'JH' Machine performs as a light milling machine, the work being moved into the cutter by means of the table handwheels.

Net Weight 4 lb. 10 oz. (2,1 kg.)

Dividing Head

Code No. 110/79-S

The Dividing Head is used to hold and rotate circular work such as discs, cones or cylinders, so as to present successive portions to the action of the engraving cutter, and may be used together with the Circular Copyholder described on page 16. It fits on any machine. Its rotary face plate which is 6 in. (152 mm) in diameter, can be rotated by hand or clamped by a lever and can be set so that its axis is inclined at any angle between vertical and horizontal. These motions are very accurately graduated in degrees. The face plate is T-slotted to receive the standard table fittings and has a ¾ in. (19 mm) central hole for accurate centring of the work. Two dogs and bolts are provided with which to clamp the dividing head to the machine work table.

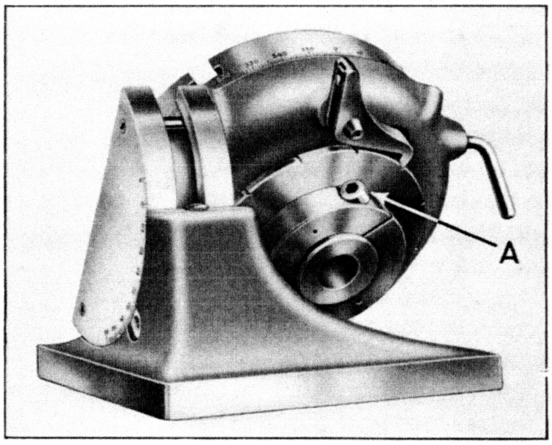


Net Weight Dividing Head 24 lb. (10,9 kg.)
Dividers for above, each ¾ lb. (0,34 kg.)

Dividers

For more rapid indexing of the face plate of the Dividing Head, Dividers (see A) of steel in the form of notched discs are attachable interchangeably to the free end of the face plate shaft, as shown in the illustration. The notches engage a hardened steel pawl. The Dividers are adjustable rotationally on the shaft and the pawl may be used either way round for clockwise rotation or the reverse.

Standard Dividers, guaranteed accurate within 2 minutes of arc, are carried in stock as follows:—



Code No.	110/86	110/85	110/84	110/83	110/82	110/81
Number of divisions	360	180	120	90	72	12
Value of each division in degrees	1	2	3	4	5	30

'Javelin' Electric Etching

Code No. 110/184-S

The Single 'Javelin' Etcher is an attachment designed for marking metal components by an electrical etching process instead of by normal engraving methods.

It is most suitable for marking hardened steel parts which cannot be engraved by normal methods after hardening, being a perfectly clean process requiring no prior or after treatment of the surface and can be the final process on finished products.

The accessory will fit any standard Taylor-Hobson Machine and converts the machine into an electrical Etching Machine.

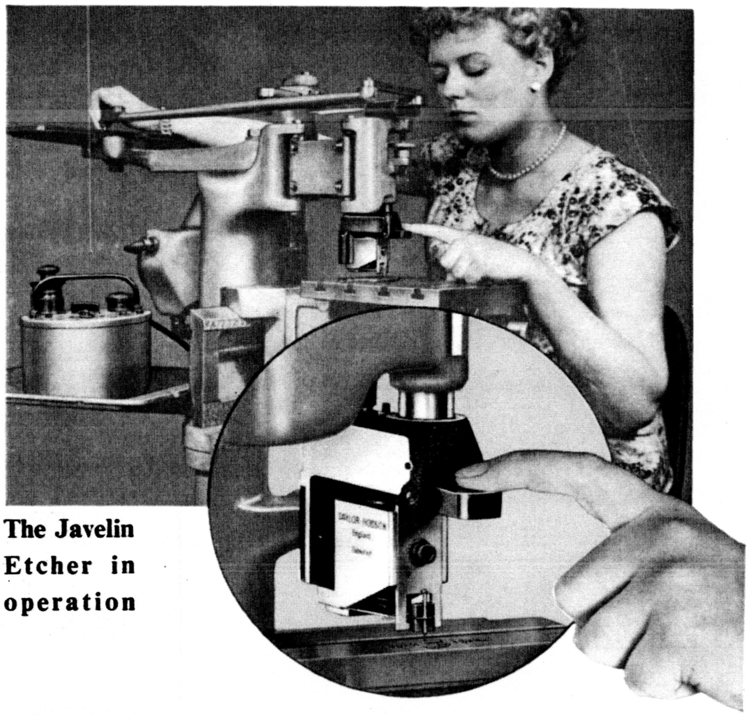
When used with the Taylor-Hobson 'JH' machine an adapter is available for this purpose. No other special equipment is needed and the Etcher is used in conjunction with standard accessories, such as Copy, Copyholders, etc.

The operation is exactly the same as that employed when engraving and the Marking Unit is moved over the surface under the control of the pantograph.

The etching process has one distinct advantage over engraving, in that the 'Javelin' electrode is free to move vertically and will automatically align itself to the surface being marked. This ensures that the process is not affected by variations in flatness of the workpiece, or wear of the electrode itself. Etching can be done on cylindrical components, within certain limitations, without using special forming attachments, etc. which are necessary in normal engraving.

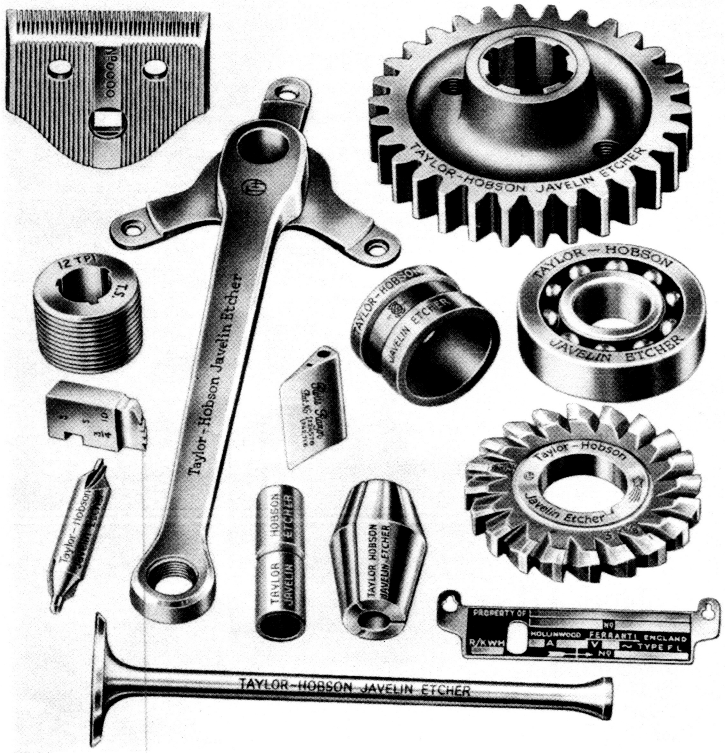
The Etcher can only be operated on a single-phase electrical supply but can be supplied to suit a 50 or 60 cycle frequency.

The Single 'Javelin' Etcher consists of a Marking Unit and a Transformer which is used in place of the normal Machine Spindle.



The Javelin Etcher in operation

TYPICAL EXAMPLES OF JAVELIN ETCHING

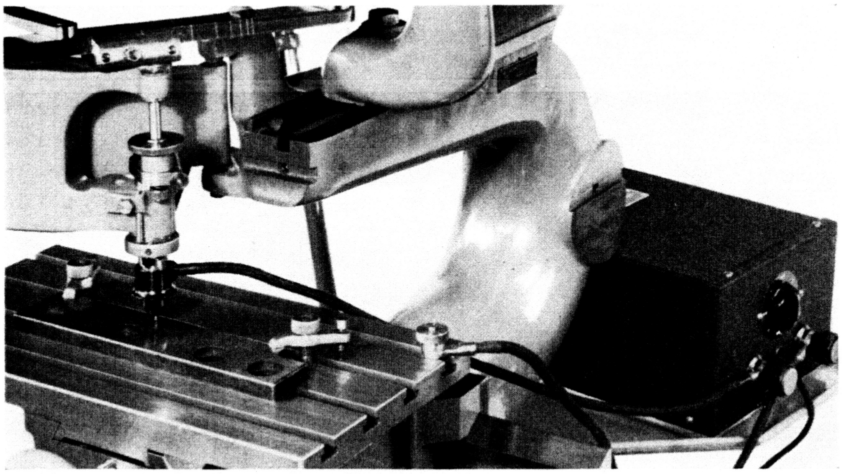

TAYLOR-HOBSON JAVELIN ETCHER
Taylor-Hobson Javelin Etcher
TAYLOR-HOBSON
JAVELIN ETCHER
Taylor-Hobson
Javelin Etcher
TAYLOR HOBSON
JAVELIN ETCHER
12 TPI
PROPERTY OF
HOLLINWOOD FERRANTI ENGLAND
TYPE F L
R/KWH
TAYLOR-HOBSON JAVELIN ETCHER

Net Weight	*25 lb. (11,3 kg.)*
Gross Weight	*36 lb. (16,3 kg.)*
Shipping Dimensions	*16 × 10 × 12 in.* *(406 × 254 × 305 mm)*

The word 'Javelin' is a registered trade mark of Taylor, Taylor & Hobson

Electric Etching

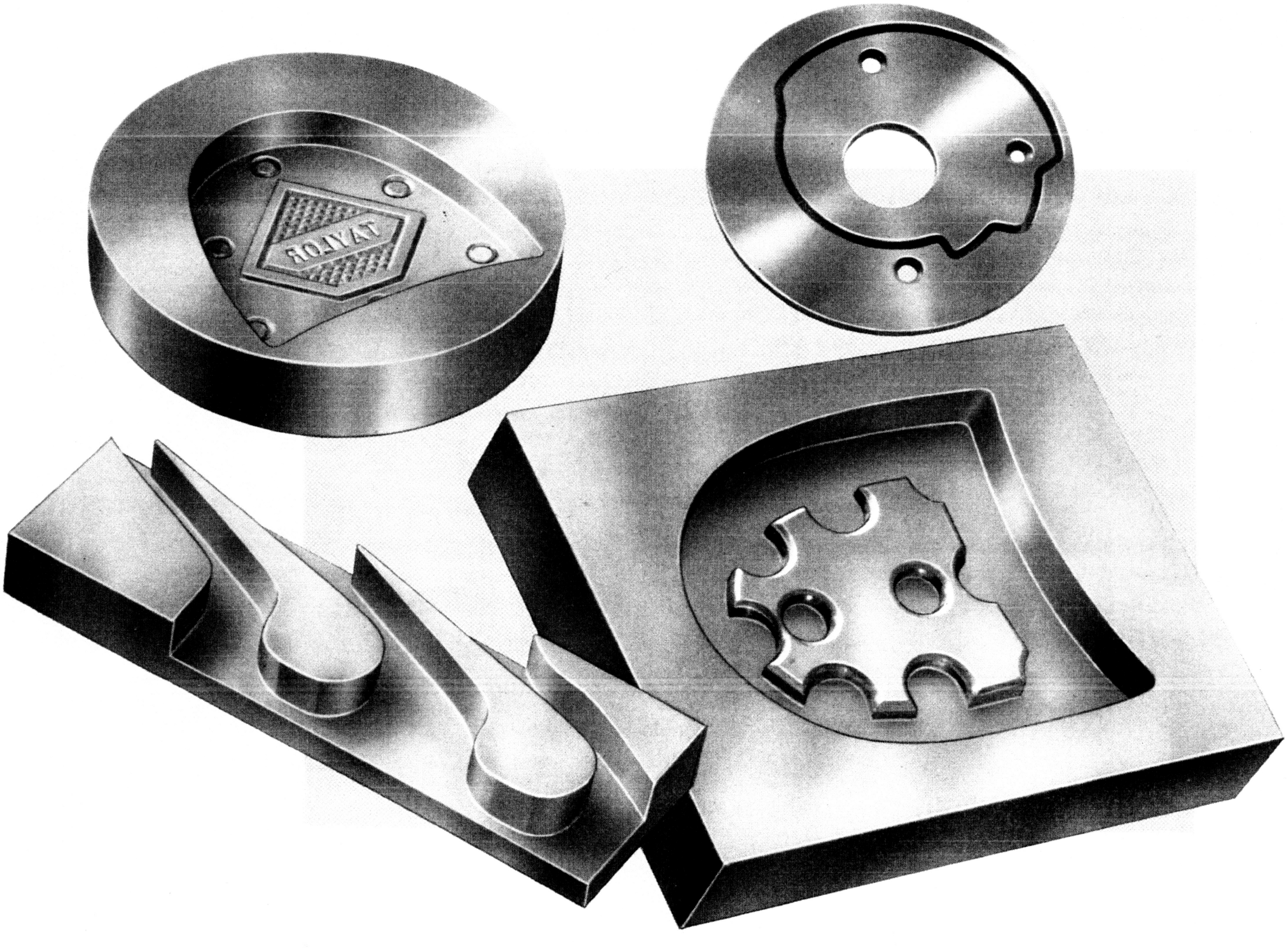
The Electric Resistance Etcher



Although normally supplied for use freehand, the Electric Resistance Etcher can be used on copying machines. The writing unit replaces the rotary cutter spindle, as shown in illustration. The electrode marks the object by heating it along the path of contact by means of a low voltage current from a special transformer. It will etch any hard or soft metal offering a high resistance to the electric current, including tool steel, stainless steel, and stellite tungsten carbide.

This equipment is very useful in tool rooms for identifying and marking tools, etc.

Net Weight 32 lb. (14,5 kg.)



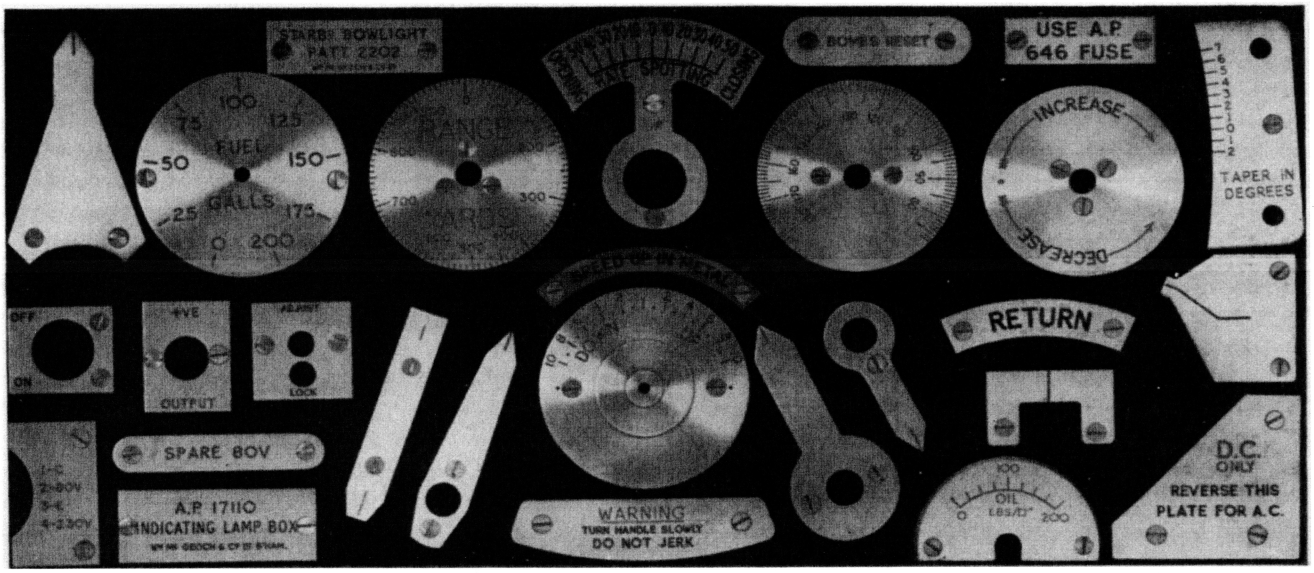
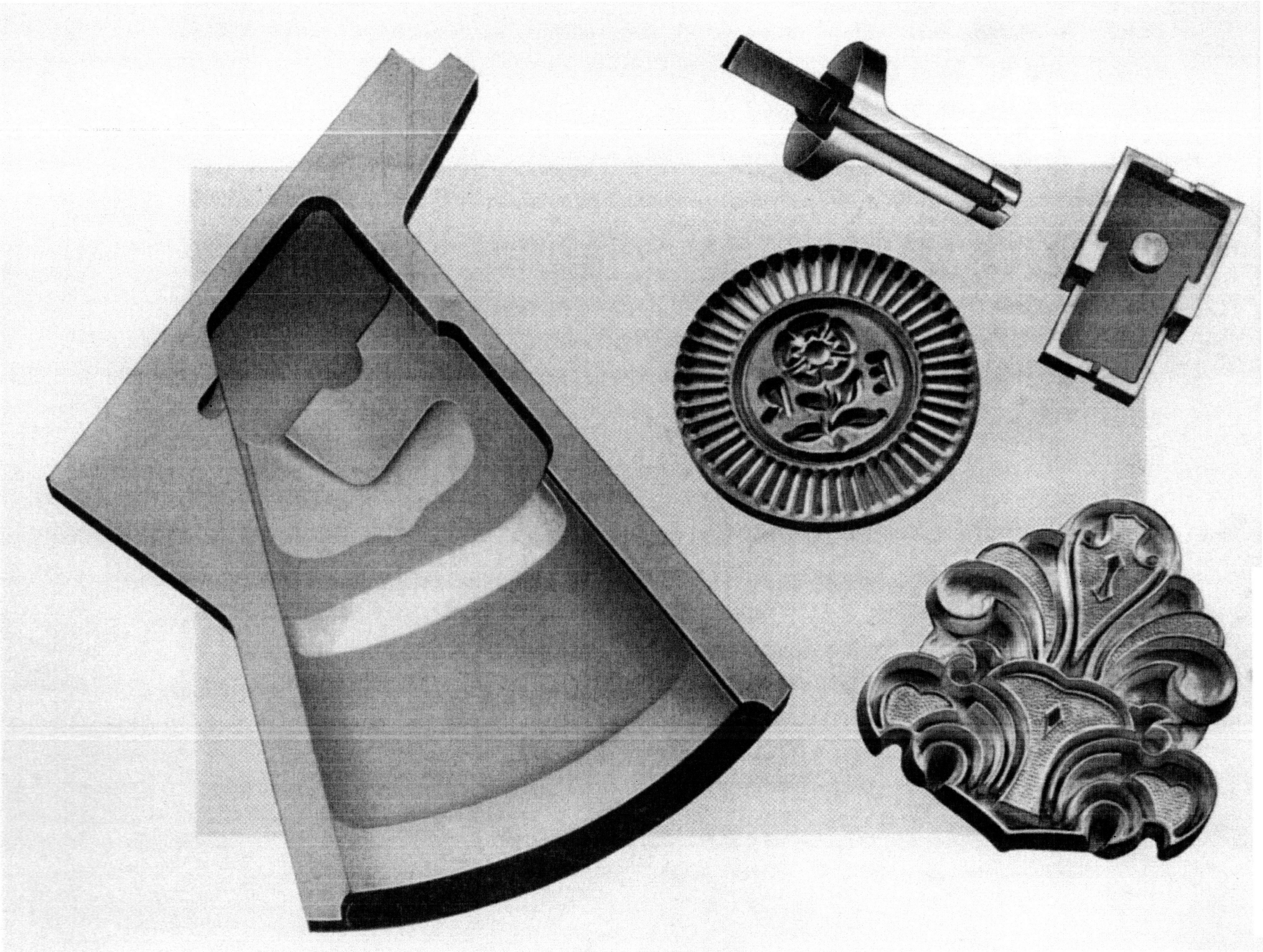

STARB'D BOWLIGHT
PATT 2202
USE A.P
646 FUSE
FUEL
GALLS
0
25
50
75
100
125
150
175
200
RANGE
STATE SPOTTING
INCREASE
DECREASE
TAPER IN
DEGREES
OFF
ON
+VE
OUTPUT
LOCK
RETURN
SPARE 80V
A.P 17110
INDICATING LAMP BOX
WARNING
TURN HANDLE SLOWLY
DO NOT JERK
OIL
LBS/□"
D.C.
ONLY
REVERSE THIS
PLATE FOR A.C.

Illustration by courtesy of Thos. A. Ingram & Co., Prescott Works, Prescott Street, Birmingham

A typical selection of brass labels, dials, scales and pointers which were machine engraved, divided, calibrated and profiled on Taylor-Hobson Engraving Machines.



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14–5/360

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